DEPARTMENT OF COMMERCE AND LABOR
BUREAU OF MANUFACTURES
JOHN M. CARSON, Chief

COTTON FABRICS IN MIDDLE EUROPE:

GERMANY, AUSTRIA-HUNGARY, SWITZERLAND

By

W. A. GRAHAM CLARK

Special Agent of the Department of Commerce and Labor

WITH REPORTS FROM VARIOUS CONSULAR OFFICERS

WASHINGTON
GOVERNMENT PRINTING OFFICE
1908

DEPARTMENT OF COMMERCE AND LABOR
BUREAU OF MANUFACTURES
JOHN M. CARSON, Chief

COTTON FABRICS IN MIDDLE EUROPE:

GERMANY, AUSTRIA-HUNGARY, SWITZERLAND

By

W. A. GRAHAM CLARK

Special Agent of the Department of Commerce and Labor

WITH REPORTS FROM VARIOUS CONSULAR OFFICERS

WASHINGTON
GOVERNMENT PRINTING OFFICE
1908

CONTENTS.

ILLUSTRATIONS.

LETTER OF SUBMITTAL.

DEPARTMENT OF COMMERCE AND LABOR,
BUREAU OF MANUFACTURES,
Washington, October 22, 1908.

SIR: I have the honor to submit herewith a series of reports from Special Agent W. A. Graham Clark on the cotton-manufacturing industry in Germany, Austria-Hungary, and Switzerland.

The methods and machinery used in the manufacture of cotton textiles, notably those specialties which find a large market in the United States, the wages paid, and other matters incidental to the cost of production, are described in appropriate chapters in such a manner as to be of value and interest to American manufacturers. To these reports have been added a number from consular officers in various sections giving additional matter of value.

Respectfully,

JOHN M. CARSON,
Chief of Bureau.

To Hon. OSCAR S. STRAUS,
Secretary of Commerce and Labor.

COTTON FABRICS IN MIDDLE EUROPE.

INTRODUCTION.

Although cotton manufacturing is an old industry in Germany, having been carried on by hand for many years previous to the introduction of machinery, it was not until 1879 that any great advances in production were made. For a long time Germany obtained the bulk of its cotton goods abroad, mainly from England, but its output has steadily grown in importance until now it is only exceeded by the United Kingdom and the United States in the extent of its manufactures.

The rate of growth in the different sections has not been the same. Saxony is the leading State in cotton manufacturing and has nearly trebled its spindles in the last twenty years, but its increase has been even greater in special lines like knitting and embroidering. Westphalia, on the Rhine, has shown the most remarkable progress in the number of spindles, having in 1905 nearly seven times as many spindles as in 1887. The total number of spindles in the Empire in 1887 was 5,054,795, which consumed 1,006,983 bales of cotton, and in 1905 they had increased to 8,832,016, with a consumption of 1,761,369 bales of cotton, an increase of approximately 75 per cent both in spindleage and cotton consumption. There are 21 towns having more than 100,000 spindles each, and these 21 towns united have more than half the spindles in Germany. The number of looms in operation in 1905 was estimated as 231,199. The weaving industry is more scattered, and there are more than 50 towns with over 1,000 looms each. The average spinning mill has 26,500 spindles, and the average weaving mill 364 looms.

GERMAN VERSUS AMERICAN EXPORTS OF COTTON GOODS.

The importance of Germany's output of cotton goods is shown by the fact that next to Great Britain it is the largest exporter of such goods in the world. The German export trade is devoted more particularly to special lines, such as knit, embroidered, braided, and similar products, rather than to the regular cotton cloths and yarns.

In the calendar year 1907 Germany exported cotton goods to the value of $89,015,570 and cotton yarns to the value of $7,886,566, or a total of $96,902,136. This total would doubtless have exceeded $100,000,000 for the year but for the financial depression in the best foreign markets during the closing months.

In the same period the United States exported $294,012 worth of cotton yarn, $14,900,421 of cotton cloths, $5,147,748 of wearing apparel, and $3,401,299 of other manufactures, or a total for cotton manufactures of $23,742,480, a little less than one-fourth the amount of similar exports from Germany. Statistical tables include also $2,579,582 worth of cotton waste among American exports of manufactured goods, which can not be considered as a credit item to the industry, but rather as a debit. The largest share of the cotton waste and linter exports goes to Germany, where they are converted into valuable textile products. The exports of raw cotton from the United States to Germany alone in 1907 reached $131,353,656, or over five times the value of the export of cotton manufactures from the United States to the entire world.

THE AMERICAN MARKET—CONCENTRATION OF SPECIALTIES.

The German export of manufactured cotton goods is of interest to the United States, not so much for its competition in foreign markets as for its competition with American cotton goods in the home market of the latter. It is largely due to the market afforded in the United States to German cotton manufacturers that their export business has increased with such strides, having advanced from $54,500,000 in 1899 to $97,000,000 in 1907. At present Germany occupies the third place in supplying the vast amount of cotton textile manufactures purchased abroad by the United States, being surpassed only by the United Kingdom and Switzerland. This trade has been steadily increasing yearly, and in the fiscal year ended June 30, 1907, Germany sent $18,212,531 worth of cotton manufactures to the United States, over two-thirds of which consisted of knit goods, laces, and embroideries.

Each special branch of cotton manufacturing in Germany tends to concentrate in some particular section and around some particular town. Chemnitz is known for hosiery, Plauen for embroidered laces, Gera for fine dress goods, Crimmitzschau for vigogne yarn, Augsburg for fine spinning, Mulhausen for fine weaving, Elberfield for colored goods, Crefeld for velvets, and Barmen for braided work.

NATIONAL INSURANCE LAWS—TRADES UNIONS.

Paternal laws have been enacted in Germany of more far-reaching character than those adopted by any other nation, and prominent among such laws are those in regard to compulsory insurance of workmen, which apply to all workers in Germany, textile or otherwise. Every worker, whether male or female, who receives under 2,000 marks ($476) a year has to insure against sickness and against old age or invalidism, and has to be insured by his employer against accident.

Nearly one-tenth of the German workers are now estimated to belong to some trades union. The rapid increase of unions among the workers has within the last few years led to similar organizations being formed among the employers for mutual protection. .

IMPORTS OF COTTON INTO AUSTRIA-HUNGARY.

The imports of raw cotton into Austria-Hungary in 1907 amounted to about $50,000,000, of which 67 per cent, or $33,500,000 worth, was supplied by the United States. Nearly the whole of the American cotton is imported via Bremen, Germany, and is included in the American exports to Germany, the direct shipments into Austria-Hungary last year, according to United States statistics, being but a trifle over $6,000,000. The total imports of raw cotton in 1907 showed an increase of over $7,500,000 over the previous year, owing to the expansion in the home consumption of cotton goods, though there has also been a steady growth in the export trade.

The exports of cotton manufactures from Austria-Hungary in 1907 amounted to about $12,500,000, of which less than $300,000 worth was sent to the United States.

COTTON MANUFACTURING IN AUSTRIA.

Cotton manufacturing is the leading industry of Austria, and is steadily advancing in importance. It is estimated that on January 1, 1907, there were 3,512,122 spindles in operation, to which about 600,000 spindles were added during the year, making the total over 4,000,000 spindles. The majority of the spindles are mule, this class being estimated as about double the number of ring spindles. The quality of the production has also been raised, and the mills now produce yarns and cloth that were formerly exclusively imported.

The majority of the mills are small, and are mostly of private ownership, there being but 22 mills operating over 50,000 spindles each. The tendency is for companies owning several small plants to gradually build up the ones best located and drop the others. The most important mills are located in Bohemia, which now contains about 60 per cent of the mills of Austria.

There is great variation in wages between the different sections and between the town and country mills in the same section. From wage lists obtained at various mills it would seem that 50 cents per day might be taken as the average cotton-mill wage in Austria.

GOVERNMENT AID TO MILLS IN HUNGARY.

The manufacture of cotton goods is yet in its infancy in Hungary. On January 1, 1907, the number of spindles was estimated as 139,682, to which additions were made during the year so that the total number reached perhaps 200,000. The present consumption of cotton is about 50,000 bales a year. Mills make mainly coarse goods, Cabots,

and some colored goods. The skilled help employed comes mainly from Austria.

In order to accelerate the growth of the cotton industry the Hungarian Government grants a number of important concessions to new mills in the way of exemptions from various classes of taxes, reduced rates and other privileges from the state railways, and a state subsidy equal to one-fourth of the capital stock, payable in ten yearly installments. It is expected that these measures will result in the industry being largely increased in the next few years.

PRODUCTION OF SPECIALTIES IN SWITZERLAND.

The Swiss cotton industry is an old one, and Switzerland was one of the first countries to take advantage of the English inventions in the early development of cotton manufacturing. Swiss cotton mills now stand in the front rank in the production of fine yarns and cloth, and in some lines their only competitor is Great Britain. However, the cotton mills have remained almost stationary for the last ten years, and only in special lines of manufacturing, such as the embroidery business, has there been any progress. The advance in this direction has been of great help in enabling the mills to find an outlet for their cloth and yarn.

At the beginning of the present year there were in operation 1,499,170 spinning spindles, with 9,900 operatives; 117,782 doubling spindles, with 2,342 operatives; and 22,709 looms, with 13,854 operatives.

About 60 per cent of the raw cotton used in Swiss mills is American, the imports from the United States in 1906, the latest figures available, being 30,111,268 pounds. The imports of cotton goods are steadily increasing, owing to the embroidery industry.

The imports of manufactured cotton goods into the United States from Switzerland during the past two fiscal years ended June 30 have been as follows:

Articles.	1907.	1908.
Cotton cloths	$738,213	$569,005
Knit goods	250,062	263,966
Laces and embroideries	13,979,808	13,209,483
	14,968,083	14,042,454

Importations of miscellaneous Swiss cotton manufactures aggregate about $500,000 annually in addition to the foregoing.

GERMANY

EXPORTS OF COTTON GOODS.

REVIEW OF THE VAST AND GROWING TEXTILE TRADE—EXCEEDED IN IMPORTANCE ONLY BY GREAT BRITAIN.

In the calendar year 1907 Germany exported cotton yarn to the value of $7,886,566, and cotton goods to the value of $89,015,570, or a total of $96,902,136. If it had not been for the financial depression in her best markets during the last months of the year this total would have been considerably over $100,000,000. In the same year the United States exported $294,012 of cotton yarn, $14,900,421 of cotton cloths, $5,147,748 of wearing apparel, $2,579,582 of cotton-mill waste, and $3,401,299 of other cotton goods, or a total for cotton manufactures of $26,323,062. Next to Great Britain Germany is the largest exporter of cotton manufactures in the world.

Cotton manufacturing is an old industry in Germany, but it was not until about 1879 that there began the development of the modern German cotton manufacturing industry, and not until some ten years later that the export business began to attain such large proportions. Since then it has steadily, though with occasional setbacks, increased until it has reached its present strength and occupies the proud position of having in the last year exported nearly four times as much manufactures of cotton as did the United States.

GERMAN TEXTILE SPECIALTIES.

The German export of manufactured goods is of interest to the United States, not so much for its competition with American cotton fabrics in foreign markets as for its competition with American cotton goods in the home market of the latter, and it is largely due to the market afforded German cotton manufacturers in the United States that their export business has increased with such strides. A striking instance of the extent to which their factories depend on the American trade is now shown at Chemnitz, Plauen, Crefeld, Barmen, etc., where I have found factory after factory running short time and a good many closing down owing to the falling off in American orders.

There are two noticeable points about the German export trade in cotton manufactures. One is that it does not depend on regular cotton cloths and yarn, but more on what might be called special lines, such as knitting, embroidering, braiding, etc. Another is that Germany does comparatively little business in cotton manufactures with uncivilized or semicivilized countries, but depends mainly on Europe and America for her markets, looking especially to the great cotton manufacturing centers of Great Britain and the United States. After these two countries Germany sells the next largest amounts to

Austria-Hungary, the Netherlands, Russia, and other European countries, and smaller amounts to India, Chile, Argentina, and Brazil. To all other countries of the world, including China, her shipments of cotton manufactures are very small. Roughly speaking, three-fifths of the cotton exports go to Europe, one-fifth to North America, and the remaining one-fifth to the rest of the world.

COTTON IMPORTS—UTILIZATION OF LOW-COST FIBER.

A large proportion of the exports of German cotton manufactures consist of cheap goods and Germany uses a large amount of cheap cotton. Next to Japan it is the largest importer of Indian cotton. Ordinarily Germany imports some 70 per cent of her cotton from the United States, 20 per cent from India, 8 per cent from Egypt, and 2 per cent from other countries. In 1907 the total amounted in value to $127,765,064, distributed by weight as follows:

Imports from—	Pounds.	Imports from—	Pounds.
United States	714,719,291	Togoland	498,765
British India	238,045,885	Haiti	368,288
Egypt	80,298,993	German West Africa	327,735
Dutch India	6,588,858	Unclassified	1,023,318
Mexico	3,691,039		
Turkey in Asia	2,256,235		1,050,026,374
China	2,207,967		

Part of the Indian cotton is used in the German home trade and part is exported in the shape of yarn to Hungary and other places, though a large portion is mixed with American cotton and used to lower the price of export goods.

Germany can not compete with England on very fine goods, with Switzerland on very fine embroideries, with the United States in a pure sized sheeting, nor with India on cheap yarns, and the Empire can not compete with Italy on cheap colored cottons to any very large extent. Germany has therefore confined export textile manufacturing largely to the making of certain specialties, like hosiery, gloves, etched lace, edgings, braids, etc.

The main cotton manufactures exported from Germany in order of value are (1) colored goods, (2) hosiery, (3) knitted gloves, (4) lace, (5) yarn, (6) embroidery, (7) trimmings. The knit goods industry is one of the most important of the export producing lines, and its steady growth accounts for the increase of shipments of cotton manufactures to the United States.

EXPORTS DOUBLE IN A DECADE.

In the last ten years Germany's export of cotton goods has about doubled. The steady progress made is shown by the following table, the amounts representing millions of dollars:

Description.	1899.	1900.	1901.	1902.	1903.	1904.	1905.	1906.	1907.
Cotton goods	49.05	58.24	52.31	61.69	71.78	80.18	90.49	93.68	89.00
Cotton yarn	5.45	6.92	6.78	7.54	7.74	7.09	8.11	7.64	8.00
Total	54.50	65.16	59.09	69.23	79.52	87.27	98.60	101.32	97.00

The imports of cotton manufactures into Germany for the same years, in millions of dollars, were as follows:

Description.	1899.	1900.	1901.	1902.	1903.	1904.	1905.	1906.	1907.
Cotton goods	7.74	8.38	7.47	8.26	8.64	9.66	10.71	13.33	14.50
Cotton yarn	13.23	14.97	11.57	12.19	14.30	15.90	14.54	19.61	29.17
Total	20.97	23.35	19.04	20.45	22.94	25.56	25.25	32.94	43.67

EXTENT OF THE YARN TRADE.

In regard to the imports it is seen that the principal item is yarn. Those mainly imported into Germany are fine yarns for use in special lines like embroidery and lace making. The exports in this branch consist mainly of thread and of coarse yarns. The numbers of the regular yarns imported into and exported from Germany—not considering vigogne and special yarns—were, in pounds, as follows for the year 1907:

Kind.	Single yarns.				Ply yarns, single twist.			
	Unbleached.		Bleached, dyed, or printed.		Unbleached.		Bleached, dyed, or printed.	
	Imports.	Exports.	Imports.	Exports.	Imports.	Exports.	Imports.	Exports.
Under No. 11	4,148,810	2,970,992	918,186	3,670,542	255,884	230,098	126,950	417,658
Nos. 11 to 16	6,600,980	938,243	499,426	892,400	113,726	119,898	36,366	324,649
Nos. 17 to 21	7,120,683	569,954	63,034	1,379,704	216,874	144,362	31,076	453,804
Nos. 22 to 31	9,706,857	755,311	31,517	900,554	1,684,297	197,919	27,550	408,842
Nos. 32 to 46	13,374,533	374,680	43,419	952,569	5,853,824	81,768	17,632	450,938
Over No. 47	17,484,332	66,781	7,715	245,525	19,175,461	322,665	34,824	992,682
Total	58,436,195	5,675,961	1,563,297	8,041,294	27,300,066	1,096,710	274,398	3,048,573

The largest quantities imported are seen to be gray yarns above No. 47, part single and part doubled. The exported yarns are seen to be mainly the coarse numbers. The bulk of the yarn imported (in 1907, 71,464,700 pounds out of 88,381,282) comes from Great Britain, with small quantities from Switzerland, India, and France. The yarns exported go mainly to European countries, Holland, Great Britain, Austria-Hungary, etc., and there are comparatively small shipments to other countries. They do a small business in this line in Turkey and Argentina, but very little in China, India, etc.

LAST YEAR'S IMPORTS AND EXPORTS.

The following table shows the weight and value of cotton and cotton manufactures imported into and exported from Germany in 1907:

Description.	Imported.		Exported.	
	Pounds.	Value.	Pounds.	Value.
Cotton in bales	1,050,026,374	$127,765,064	112,333,031	$13,804,238
Bleached cotton	370,052	54,264	4,125,227	623,560
Total cotton	1,050,396,426	127,819,328	116,458,258	14,427,798
Roving and slubbing	8,155	1,190	46,504	8,330
Vigogne yarn			1,123,820	175,882
Single yarns:				
Bleached, dyed, or printed	58,436,195	16,290,624	5,675,961	1,011,262
Unbleached	1,563,297	300,118	8,041,294	1,787,380
Ply yarns:				
Single twist, unbleached	27,300,066	12,208,448	1,096,710	308,686
Single twist, bleached, dyed, or printed	274,398	83,300	3,048,573	1,129,072
Cable twist, unbleached	58,406	34,934	322,886	174,454
Cable twist, bleached, dyed, or printed	31,738	19,516	721,369	412,930

Description.	Imported.		Exported.	
	Pounds.	Value.	Pounds.	Value.
Cotton thread	708,887	$353,668	7,033,184	$2,850,962
Unclassified yarns			39,672	27,608
Total yarn, etc	88,381,142	29,290,898	27,149,973	7,886,566
Unbleached cloths, weighing per square meter—				
80 grams or over	10,077,790	3,917,718	3,371,679	1,302,098
40 to 80 grams	2,144,712	1,036,014	2,016,219	973,182
Under 40 grams	331,041	319,872	292,250	282,268
Dressed or bleached cloths	2,259,320	1,097,894	7,936,384	3,770,872
Cloths dyed, printed, or colored	2,616,148	1,276,870	58,305,226	25,210,388
Knitted and netted stuffs	54,218	24,038	596,743	270,605
Gloves	12,342	29,274	4,743,008	11,267,872
Stockings or socks	35,705	34,034	19,660,121	18,929,330
Underclothing	40,113	19,278	7,984,431	3,699,234
Fishing nets	406,418	101,626	511,769	267,512
Other knitted or netted goods	9,918	6,902	2,834,564	1,974,686
Lace of all kinds	619,544	2,007,054	4,556,329	9,098,026
Embroidery on cotton foundation	387,684	1,036,490	3,146,430	6,716,598
Velvet and plush tissues	1,984,702	973,896	2,602,704	2,279,802
Fire and other hose and girths	97,196	36,414	2,511,678	812,294
Furniture and upholstery goods	311,646	252,518	1,250,990	738,276
Open woven tissues for curtains	40,994	60,452	716,080	511,938
Wicks, woven or plaited	7,714	2,380	841,267	228,718
Tulle	1,038,525	2,130,814	135,987	205,632
Edgings, ribbons, tapes, etc	105,131	113,526	147,448	113,288
Cotton felts	16,971	5,712	245,746	75,208
Rope, cord, or twine	42,758	10,234	125,408	32,844
Unclassified			193,732	254,899
Total cloth, etc	22,640,590	14,493,010	124,726,193	89,015,570
Total cotton manufactures		43,783,908		96,902,136

DISTRIBUTION OF FABRIC PRODUCTIONS.

As noted in the statistics the cotton goods go mainly to other European countries and the United States, with smaller quantities to other regions. Of the small amount of gray goods shipped the largest consumers are Great Britain and Switzerland. Included in this are muslins, shirtings, and some sheetings. The bleached goods consist of muslins, calicoes, and similar goods, besides smaller amounts of a wide range of varieties. The largest market is the United States, then Great Britain, Switzerland (mainly muslin for embroidery foundation), Argentina, etc. The goods comprised under the head of colored, dyed, and printed goods amount to over $25,000,000 and are scattered abroad more widely than any of the other products of the German cotton mills. The main markets found for these goods and the amounts sent to each in 1907, in pounds, were as follows:

Country.	Pounds.	Country.	Pounds.	Country.	Pounds.
United States	1,611,124	Holland	3,419,065	Switzerland	2,673,232
Great Britain	7,401,472	Brazil	3,341,586	Roumania	2,398,513
India	4,739,922	Turkey	3,113,150	Belgium	1,893,677
Argentina	4,142,198	Chile	2,934,185	Egypt	1,832,538

Included under this heading is a wide range of goods from the coarsest checks and stripes to Jacquard work. The bulk of these goods is of medium grade. Some of the prints shipped from Mulhausen are very fine goods and rival those of the English and French. Under the head of knit goods, the gloves are taken by Great Britain and the United States; of the hosiery half goes to the United States, and of the knitted underclothing over half is taken by Great Britain. Of the lace exported over a third goes to the United States and nearly a

third to England, while of the embroidery over a third goes to Great Britain and nearly a third to the United States. These laces are mainly the Plauen etched lace, while the embroidery is mainly of a cheaper grade of work than that produced at St. Gall. Velvets and plushes exported go to Russia, United States, India, etc. Furniture and upholstery goods find their best market in Great Britain. Edgings, ribbons, tapes, etc., go to Great Britain and the United States.

The foregoing brief classification of the main countries buying Germany's cotton goods shows what an important position is held by the American trade. The United States takes one-half of the hosiery exported from Germany, one-third of the gloves and a third of the lace, besides large quantities of other cotton manufactures, especially those produced on the braiding machine and the ribbon loom.

LARGE SHARE IN IMPORTATIONS OF UNITED STATES.

Germany occupies the third place in supplying the vast amount of cotton textile manufactures bought from abroad by the United States every year. This is shown by the following table giving details of American purchases of the leading articles from the four countries which together supplied three-fourths of the $79,524,943 worth of cotton manufactures imported into the United States in the calendar year 1907:

Country.	Cloth.	Knit goods.	Laces and embroideries.
United Kingdom	$11,642,816	$117,313	$7,256,131
Switzerland	692,323	267,513	15,574,414
Germany	588,703	8,384,830	5,341,332
France	1,133,301	400,643	12,260,861
Other countries	370,815	38,878	1,010,625
Total	14,427,958	9,209,177	41,443,363

It is seen from this that in the main Great Britain ships to America cloth and laces, Switzerland only embroideries, and France mainly laces, while Germany ships largely knit goods and embroidered laces.

The textile exports from Germany to the United States have been steadily increasing for some years, the increase being mainly represented in the knit goods line, which more than makes up for decreases in some other lines. The following figures show how the knitted goods and stitched goods have been increasingly imported into the United States from Germany in the last few fiscal years ending June 30:

Description.	1903.	1904.	1905.	1906.	1907.
Cloths:					
Plain	$1,878	$4,991	$16,090	$10,954	$13,961
Bleached, dyed, or printed	603,467	532,613	533,287	532,196	563,639
Clothing, not including knit goods, but including gloves	1,487,015	1,722,961	1,521,338	1,795,224	2,521,467
Knit goods	5,472,059	5,449,903	5,504,843	6,383,371	7,830,986
Laces, embroideries, etc	4,540,612	4,545,545	5,331,326	6,044,151	5,425,317
Plushes, etc					243,553
Yarn and warp	354,121	419,016	375,499	555,783	434,500
All other	1,677,134	1,481,567	1,050,380	1,137,936	1,179,108
Total	14,136,286	14,156,596	14,332,763	16,459,615	18,212,531

METHODS CONDUCIVE TO SUCCESS.

Germany's vast sales of cotton manufactures to the United States are largely due to the fact that German manufacturers ship special lines and cater to the demand in these lines. Thus in etched laces there are at Plauen large numbers of designers continually getting out new samples and the manufacturers are willing to make up any size orders desired and pack as desired. In hosiery there are new varieties coming out all the time; likewise in gloves, hat braids, passementerie, etc. The German designers frequently get ideas from the United States, but their willingness and ability to make small lots of a large number of special designs is one factor that has had a great deal to do with their American sales.

Germany sends out large numbers of commercial travelers and these men are usually good linguists and well versed in their business. They meet the buyer personally, offer long credits in such countries as Turkey and Egypt, cater to the buyer's taste as to marking, packing, etc., and are very persistent in their efforts to make sales. Other factors that have largely helped German sales in some sections, especially in South America, have been the presence of large colonies of German emigrants. The increasing merchant fleet of Germany offers a ready means of shipment under their own flag to any part of the world, and the Germans are more and more following the precedent so long followed by England of the banker working hand in hand with the merchant in developing foreign fields and establishing branch banks wherever good trade prospects are to be found. The latest instance of this is the chain of banks now being established by German capital in the leading towns of the Levant.

GROWTH OF MANUFACTURES.

NUMBER AND EXTENT OF THE FACTORIES—PROFITS REALIZED—PAY AND PRIVILEGES OF EMPLOYEES.

In the manufacture of cotton goods Germany holds third place, being only exceeded by the United Kingdom and the United States. In the exports of cotton goods Germany is only exceeded by the United Kingdom. Raw cotton is the largest single import of Germany, and manufactured cotton the largest export. In 1907, the imports of raw cotton amounted to 933,938,168 pounds, valued at $113,391,530, and the exports of cotton manufactures amounted to 151,916,167 pounds, valued at $97,002,136. The average value of the cotton imported was 12.14 cents per pound, and the average value of the manufactured product was 63.84 cents per pound.

Cotton manufacturing is an old industry in Germany, and before the introduction of machinery there were well-known centers of weaving, knitting, braiding, lace making, etc., in Saxony and on the Rhine. The German people were slow to avail themselves of the introduction of modern machinery, so that many local hand industries were stifled by the flood of machine-made goods from other countries, and for a long time Germany obtained the bulk of its cotton goods abroad, mainly from England. The unification of the German Empire in 1870 awakened the national spirit, and, encouraged by a firm central Government, there began an agitation for the manufacture of cotton goods at home. The 1,500,000 spindles taken over with Alsace-Lorraine put the German industry ahead of the French, and this lead was further widened by the increased momentum in the cotton-manufacturing industry about 1879. Since then there has been no very remarkable spurts, but a gradual and steady growth.

INCREASED PRODUCTION BY STATES.

The rate of growth in the different sections has not been the same. Saxony is the leading German State in cotton manufacturing, and has nearly trebled its spindles in the last twenty years, but its increase has been even greater in special lines like those of knitting and embroidering. The State that has shown the most remarkable progress is Westphalia on the Rhine, which had nearly seven times as many spindles in 1907 as it had in 1887. That part of Hanover near the cotton center in northern Westphalia shows a large comparative increase, and so does Wurttemberg, both of these having more than doubled their number of spindles. Bavaria and the Rhine Province also show substantial increases; Alsace a very slight increase. The Alsatian mills,

however, have advanced further than the others in the direction of fine goods, which can be seen from the fact that while they have increased in spindleage 10 per cent there has been a 4 per cent decrease in their consumption of cotton.

The following statistics, furnished by the Bremen Cotton Bourse, shows the number of spindles and the amount of cotton consumed in the several kingdoms and provinces of Germany in 1887 and in 1905:

Kingdoms and provinces.	1887.		1905.		Increase.	
	Spindles.	Cotton consumed.	Spindles.	Cotton consumed.	Spindles.	Cotton consumption.
	Number.	*Bales.*	*Number.*	*Bales.*	*Per cent.*	*Per cent.*
Saxony	541,122	90,505	1,321,288	225,000	144.2	148.6
Saxony, vigogne spinning	460,447	102,200	628,025	163,085	36.4	59.6
Bavaria	924,312	161,516	1,578,084	300,000	71.0	85.7
Alsace-Lorraine	1,375,000	250,000	1,511,586	240,000	9.9	[a] 4.0
Westphalia	285,828	59,500	1,172,222	255,300	310.1	329.0
Rhine Province	435,802	165,580	1,051,362	287,090	58.5	73.4
Wurttemberg	354,548	54,390	706,585	115,000	99.3	111.4
Baden	398,172	58,562	468,784	80,134	17.7	36.8
Hanover	105,000	18,350	211,740	48,425	101.6	164.0
Silesia	75,064	21,500	109,320	28,315	45.6	31.7
All others	99,500	24,880	73,020	19,020	[a] 26.7	[a] 30.0
Total	5,054,795	1,006,983	8,832,016	1,761,369	74.7	74.9

[a] Decrease.

The German Empire is composed of the 3 free cities of Hamburg, Bremen, and Lubeck; of the 4 kingdoms of Saxony, Bavaria, Wurttemberg, and Prussia (the latter having 13 provinces); 7 principedoms, 6 grand duchies, 5 duchies, and the Imperial Province of Alsace-Lorraine. Cotton manufacturing is almost exclusively contained in the four kingdoms and the Imperial Province. East of Saxony, with the exception of a few towns in Silesia, there is no cotton manufacturing, and in the Kingdom of Prussia itself there is practically none except in the two western provinces.

THE CENTERS OF MANUFACTURE.

German cotton manufacturing is more scattered than the English, Swiss, Italian, or East Indian, but there are three well-defined centers—the Saxon, the Alsatian, and the Westphalian (see explanatory map, in which the main and lesser cotton-manufacturing towns are indicated by ringed and solid dots, respectively).

The first section lies north of the mountains of northern Bohemia, and consists of the Kingdom of Saxony and the Upper Franconia Province of Bavaria. In regard to general cotton manufacturing, including not only spinning and weaving, but knitting, embroidering, lace making, cotton-waste manufacture, artificial flowers, etc., it is the most important section of Germany. It contains some 3,000,000 spindles, and its most important towns are Hof, Baireuth, and Bamberg, in Upper Franconia, and Chemnitz, Mittweida, Plauen, Plaue, Werdau, Crimmitschau, Zittau, and Zwickau, in Saxony. The second section lies in the extreme southwest corner of Germany, between the cotton-manufacturing districts of East France, Switzerland, and the Austrian Vorarlberg, and contains some 4,000,000 spindles, unequally distributed between Alsace, Baden, Wurttemberg, and Bavarian Swabia. The main cotton-manufacturing towns are Mulhausen, Gebweiler, and Logelbach, in Alsace; Augsburg and Kempten, in Bavaria; Unterhausen in Wurttemberg; and Lorrach in Baden.

MAP

SHOWING LOCATION OF THE

COTTON MANUFACTURING INDUSTRY

IN GERMANY.

The third section lies in the northwest corners of the Prussian Rhine and Westphalian provinces, and has 2,500,000 spindles. The main centers are Gronau, Rheine, Bocholt, and Epe, in Westphalia, and Rheydt, Munchen-Gladbach and Mulfort, in the Rhine Province.

There are in Germany 21 towns having more than 100,000 spindles each, and these 21 towns united have more than half the spindles in Germany. These towns, with the number of spindles and looms in each, are as follows:

Towns.	Spindles.	Looms.	Towns.	Spindles.	Looms.
Mulhausen	520,300	8,797	Chemnitz	165,900	1,897
Augsburg	509,676	9,630	Mittweida	162,000	1,761
Gronau	494,234	1,055	Logelbach	146,908	3,253
Rheine	406,728	5,175	Crimmitschau	142,560	----------
Rheydt	345,113	4,421	Baireuth	141,032	758
Hof	325,136	3,169	Bamberg	125,000	2,186
Werdau	304,000	----------	Falkenau	107,000	----------
Munchen-Gladbach	273,478	8,493	Kempten	106,808	2,489
Gebweiler	210,132	2,027	Plaue	105,000	----------
Leipzig	206,000	----------	Mulfort	100,446	----------
Bocholt	197,220	7,838			

The weaving industry is more scattered, and there are more than 50 towns with more than 1,000 looms each.

LEADING MILL TOWNS.

Mulhausen in Alsace is the most important town in Germany as regards spindles and looms. Nowhere in Germany is the cotton industry better organized than at Mulhausen, and this place has become noted for its fine muslins and print goods. One of the main products of this place is a fine cotton print known locally as a 75/26 print, but which we would call a 24/26 print—that is, with 24 warp and 26 filling ends per $\frac{1}{4}$ inch. These are made 31 to 32 inches wide, and some of them are exported to the United States. Having a large local trade, Mulhausen is not a great export center, though it ships some fine bleached goods and fine prints to the neighboring sections of France and supplies muslin for St. Gall embroiderers. Mills are scattered throughout the country around Mulhausen. These mills do not build the ugly tenements as seen everywhere in Saxony, but house their help in cottages containing each one or two families. The operatives enjoy more privacy and have more real home life than is seen in most textile sections of Germany. Frequently only one or two of the family work in the mill, while the others tend a farm. Besides Mulhausen, the other two large textile centers of Alsace are Gebweiler and Logelbach, though there are a score or more of smaller towns of more or less importance clustered in this vicinity.

Next to Mulhausen the largest cotton mill town is Augsburg, in the province of Swabia, in Bavaria. This is one of the important towns of South Germany. It has about 95,000 people, and lies at the junction of the Wertach and Lech rivers, 38 miles northwest of Munich. Contrary to the custom of Mulhausen, where practically no water power is used, the Augsburg mills are run mainly by water power. Canals traverse the town and the mills are situated on these canals on the outskirts of the town. A manufacturer estimates that Mulhausen spins average No. 36s, and Augsburg average No. 26s.

Gronau, in Westphalia, has only six mills and is a little village of only 8,500 inhabitants, but is the third largest cotton-mill town in

Germany. This is mainly due to the fact that the largest cotton-spinning mill is located at this point.

One of the densest cotton-mill centers is that made by the three close neighbors, Rheydt, Munchen-Gladbach, and Mulfort, in the Rhine Province. These three towns, of 40,000, 60,000, and 8,000 inhabitants, respectively, have together 719,037 spinning spindles, 75,000 twister spindles, and 12,914 looms.

SPECIALIZING CENTERS—GENERAL STATISTICS.

Chemnitz stands twelfth in number of spindles, but is one of the most important cotton manufacturing towns in Germany. Its importance is due to the fact that it is the center of the German knit goods manufacture. Plauen is a town with no spinning and few looms, but is also an important cotton-manufacturing center, owing to its etched lace and embroidery work. Very little machine-made lace is made in Germany, but the largest factory of this kind is at Dresden. Except for this, and for the manufacture of artificial flowers, Dresden is not important as a cotton manufacturing center. Werdau and Crimmitzschau, in western Saxony, are important as being the center of the large vigogne yarn spinning business. Barmen, in the Rhine Province, is noted for its braided work and for its manufactures on the ribbon loom. Crefeld is noted for its velvet manufacture and velvet dyeing; Elberfeld for its dyeing; Munchen-Gladbach for its colored goods, etc.

Comparatively few of the German mills have both spindles and looms, and in the big centers the mills specialize on either spinning or weaving, as is the custom in England. The more remote mills in the country sections of Alsace and the Rhine usually weave their own yarns.

CONDITION OF THE INDUSTRY.

The following table shows the status of the German cotton manufacturing industry at the end of 1905, giving the details of the industry in each State:

States.	Spinning mills.	Spinning and weaving mills.	Weaving mills.	Spindles.	Twister spindles.	Looms.	Bales of cotton consumed.
Saxony [a]	96	7	54	1,968,580	89,824	39,236	388,085
Bavaria	16	13	53	1,577,632	38,686	31,092	300,000
Alsace	16	32	43	1,536,562	16,550	39,919	240,000
Westphalia	17	18	36	1,456,636	47,892	25,729	255,300
Rhine Province	42	24	121	1,275,355	110,454	24,408	287,090
Wurttemberg	11	17	48	761,440	6,380	19,352	115,000
Baden	10	13	28	526,804	16,580	16,744	80,134
Hanover	1	7	18	225,000	17,400	5,024	48,425
Silesia	9	5	45	133,930	1,250	16,540	28,315
All others	7	6	47	268,270	25,600	13,155	19,020
Total	225	142	493	9,730,209	370,616	231,199	1,761,369

[a] Includes 60 mills on vigogne spinning with 608,950 spindles.

This table shows that Saxony has practically no mills that combine both spinning and weaving, while Alsace has the largest number of these. By dividing 9,730,209 spindles by 367 spinning mills and 231,199 looms by 635 spinning and weaving and weaving mills it is apparent that the average spinning mill in Germany has 26,500 spindles and the average weaving mill 364 looms. Bavaria, with an average of 54,400 spindles to the mill, is seen to have mostly large mills,

while the Rhine Province, with only an average of 19,300 spindles, is seen to have a great number of small mills. The Bavarian weaving mills average twice the size of weaving mills on the Rhine.

The foregoing table does not correspond exactly as to the number of spindles with that previously given by the Bremen Cotton Bourse, but was made up at the end of the year 1905 by W. Rieger, of Stuttgart, and this is the latest complete table that can be found in Germany in regard to cotton-mill statistics. There has not been a table made up by anyone since 1905, though the president of the German section of the International Federation of Master Cotton Spinners and Manufacturers' Association estimates that on March 1, 1908, there were in Germany 9,592,855 spindles in operation, and 455,946 being installed, or a total of 10,048,801. He furnished me with a table showing that the 9,191,940 spindles estimated by him as being in operation on August 31, 1907, had consumed during the previous twelve months the following number of bales of cotton from the several countries, counting 2 round bales of American as equal to 1 square bale: American, 1,135,538; Indian, 380,367; Egyptian, 98,615; all other, 46,660; total, 1,661,180.

REPRESENTATIVE MILLS AND THEIR EMPLOYEES.

Both spindles and cotton consumption as estimated by this association are lower than the detailed figures showing the number of mills and the spindles of each that were compiled by Mr. Rieger in 1905, and since for the calendar year 1907 there were used in Germany—as shown by the imports less the reexports—933,938,168 pounds of cotton, net weight, as compared with 812,050,576 pounds in 1905, or 15 per cent more, it is probable that the estimated figures of the association are too small.

The German department of the interior informed me that they had no recent figures, and that those of W. Rieger, of Stuttgart, for 1905 were the most recent that they knew of.

There are twelve cotton mills in Germany with over 100,000 spindles each, and two of these have each over 200,000 spindles; five mills have more than 2,000 looms each, and 35 have more than 1,000 looms each. The following are the largest German cotton mills:

Company.	Town.	Province.	Spindles.	Looms.
Gerritt van Delden & Co	Gronau	Westphalia	220,000	
Leipsiger Baumwoll-Spinnerei	Leipzig	Saxony	206,000	
Baumwollspinnerei am Stadbach	Augsburg	Bavaria	148,316	
Vogtlandische Baumwollspinnerei	Hof	do	144,780	
Kullman & Cie	Mulhausen	Alsace	143,000	1,700
Chemnitzer Aktien-Spinnerei	Chemnitz	Saxony	142,000	
Mittweida Baumwollspinnerei	Mittweida	do	140,000	
Mechanische Baumwoll-Spinnerei und Weberei.	Augsburg	Bavaria	126,940	2,920
Do	Bamberg	do	125,000	2,000
Georg Lieberman	Falkenau	Saxony	107,500	
E. J. Claiss Nachfolger	Plaue	do	105,000	
C. Kümpers Söhne	Rheine	Westphalia	105,000	1,400
Hartman & fils	Munster	Alsace	51,200	2,460
Ulrich Gminder	Reutligen	Wurttemberg	92,330	2,084
Herzof Etablissements	Logelbach	Alsace	85,000	2,000

The most important cotton mill in Germany, also the best paying, as shown by its published dividends, is the Augsburg Mechanische Baumwoll Spinnerei und Weberei at Augsburg, in Bavaria. This mill has 126,940 spindles running on average No. 17s English, and

2,920 looms, of which 520 are on bleached goods, especially printers, and 2,400 on heavy gray goods. It employs some 3,000 operatives, and its annual pay roll amounts to about $450,000. Water power is used, with supplementary steam power. It uses nearly 30,000 bales of cotton and produces some 12,000,000 pounds of yarn and 30,000,000 yards of cloth yearly. The mill was founded in 1837, and its capital stock is now 3,600,000 marks ($856,800), while its 4 per cent bonded indebtedness is 500,000 marks ($119,000). The mill has a large reserve fund, and a special sinking fund, and has 200,000 marks ($57,600) reserved for the pension and relief of employees. The dividends distributed by this mill to its stockholders for the seven years ended with 1903 were, in consecutive order, 20.4, 14.6, 16, 23.5, 17.5, 23.5, and 28 per cent, or 143.5 per cent in the seven years.

THE LABOR QUESTION.

Heating and ventilation in this mill is carried on by means of flues built in the wall, the air going up the flues on one side and being drawn down to the basement again through the flues on the other side. Separate dressing rooms with clothes lockers are provided for the men and women on each floor. There is also provided a large hall with tables and chairs where the operatives can eat their lunches. Coffee and milk is sold in the morning, hot soup at noon, and beer at 4 o'clock. A demi-liter (about a pint) of coffee with milk is sold at 7 pfennigs (1.67 cents); a portion of soup with vegetables and, occasionally, with meat, is sold for 30 pfennigs (7.14 cents), and beer sells for 20 pfennigs (4.8 cents) a liter (1.05 quarts). This is almost cost price, and any profit over expenses goes to the workers' pension fund. Operatives are lodged partly in tenement houses and partly in cottages. A lodging of three rooms and a kitchen rents for 100 to 140 marks ($23.80 to $33.32) a year. Until 1906 this mill ran an 11-hour day, but it then changed to 10 hours. This 9.1 per cent decrease in time was allowed by a 7.85 per cent decrease in production. In regard to wages at this mill, the picker room hands and the carders get 50 to 70 cents a day; on two 900 self-actor mules the spinner averages about 90 cents a day, the piecer 71 cents, and each of the two creelers 35 cents a day. Weavers, on an average, run three looms apiece, and make about 80 cents a day; 170 of the looms have the Northrop attachment. At this mill a man is supposed to serve a two-years' apprenticeship before he can do as simple work as that of running three looms on plain goods. He has to sign a two-years' contract to this effect. He first works as extra assistant to a weaver for six months, then he is given one loom, which is run under the supervision of the regular weaver, who receives a certain percentage on the wages made. Then he is given two looms under the same conditions, and it is not until the new weaver has been working for two years that he is considered a full-fledged weaver and allowed to enjoy the fruits of his labor without division. During the first six months the mill usually pays the apprentice 24 cents a day.

DOUBTFUL RESULT OF THE APPRENTICESHIP SYSTEM.

After all this elaborate apprenticeship system it is doubtful if the weaver is as good as the young American weaver who comes in from the farm and in a few months at most is getting off the required production along with the others. All fines and pen-

[From Consul C. B. Hurst, Plauen.

INTERIOR OF A SAXON HOME, SHOWING AN OLD-FASHIONED HAND LOOM.

alties are paid to a sick fund. Besides the regular Government insurance, this mill has special insurance funds of its own for the relief of the sick, for old age and invalid pensions, for the relief of widows, etc.

The pension fund of this mill provides a pension after 20 years of service equal to 30 per cent of the annual wages; this is augmented 2 per cent every year up to 40 years service when it is 70 per cent. It is then augmented 3 per cent per year up to 50 years when the worker is entitled to a pension equal to his regular wages. Except in special cases a worker is not accorded a pension until he has reached the age of 50 years.

By means of the two years' apprentice contract for weavers, and by means of the old age and other pensions for long service, this mill offers all inducements possible to insure the worker remaining at home. The German operatives do not roam about from mill to mill as is so much the custom in the United States, and therefore the mills are enabled to keep their processes more secret, and little improvements made at one mill are not so soon caught up and made general among other mills. According to law, the mill is supposed to pay one-third of the yearly premiums on the workers insurance, the workers paying the other two-thirds, but this mill voluntarily pays two-thirds, as do a good many other mills, only leaving one-third to be paid in to the Government by the operatives.

LARGEST SPINNING MILLS.

While the foregoing is the most important cotton mill in Germany it does not have the largest number of spindles, the first place in this respect being held by the mill of Gerritt van Delden & Co., with 220,000 spindles, located near the Holland border, in Westphalia, at the little village of Gronau.

The mill with the next largest number of spindles is the Leipziger Baumwoll-Spinnerei, at Leipzig-Lindenau, in northern Saxony. This mill makes a specialty of combed and carded Egyptian yarns of all numbers, from 10s to 120s. The annual consumption is some 28,000 bales of cotton. The capital is 3,000,000 marks ($714,000). Besides regular and special reserve funds there is a fund for the pension and relief of workmen amounting to 110,000 marks ($26,180). The dividends paid by this mill in the six years ended with 1906, were consecutively 12.5, 12.5, 12,5, 14, 16, and 16 per cent, or a total of 97.5 per cent. Each operative commencing work at this mill is given a copy of the mill rules and regulations and has to agree to abide by these by signing his name in a special register. About a third of the employees belong to unions. This mill employs quite a number of Poles and Bohemians. At the mill dining hall there is sold every morning before work commences coffee, milk, and cocoa, to induce the workmen to refrain from taking a morning dram of spirits. Bathing at least once every two weeks is obligatory at this mill. On the envelope containing his fortnight's wages each workman finds a card indicating the day and hour that he is to report at the bath house. Sick insurance calls for $3\frac{1}{2}$ per cent of the wages, but the workman pays $2\frac{1}{3}$ per cent of this, and the factory $1\frac{1}{6}$ per cent. Where this sum does not cover the expenditures, as often happens, the factory voluntarily makes up the deficit without calling on the workers.

A PROSPEROUS YEAR—PRIVATE AND STOCK COMPANIES.

In regard to the dividends paid by the two foregoing mills it should be stated that these are not to be taken as averages for German mills. A list that was published of the results of 40 leading German cotton mills shows that in 1906, 5 out of the 40 declared over 20 per cent dividends, 17 others paid over 10 per cent, 15 paid between 4 and 10 per cent, and two lost money. This was an exceptionally prosperous year.

The bulk of the German cotton mills are private companies. The most recent figures show that of the spinning mills some 75 per cent are private companies, also 66 per cent of the combined spinning and weaving mills and 98 per cent of the weaving mills. Bavaria, which has the largest mills, also has the largest percentage of incorporated stock companies—in fact, the majority of the Bavarian spinning mills are stock companies. In Westphalia, on the Rhine, and in Saxony nearly all mills are private companies. The weaving mills in Bavaria as well as elsewhere are practically all private companies.

Of the 231,199 looms in Germany in 1905 it was estimated that about 40 per cent were on colored goods, 30 on heavy gray goods, 20 per cent on calico and similar goods, and 10 per cent on fine goods. Goods are made from the finest yarns most largely in Alsace, then in Saxony, and then Bavaria.

RESULTS OF THE SHORTER WORKDAY.

As it is frequently claimed that the shorter the working day the more intense is the work, it is interesting to see what result was obtained in Bavarian cotton mills by the reduction on January 1, 1906, of the working hours from eleven to ten. The following statistics have been published showing the decreased consumption of cotton and the decreased production at seven of the leading mills of Augsburg:

Mills.	1905.	1906.	Per-centage decrease.
Mechanische Baumwoll-Spinnerei und -Weberei:			
Cotton consumed ..... bales..	28,447	26,792	5.82
127,000 spindles on No. 17, yarn produced ..... kilos..	5,381,000	4,957,400	7.85
Baumwoll-Spinnerei am Stadtbach:			
Cotton consumed ..... bales..	26,213	24,011	8.40
147,000 spindles on No. 23½, yarn produced ..... kilos..	5,165,000	4,866,600	5.78
Haunstetter Spinnerei und Weberei:			
Cotton consumed ..... bales..	4,773	4,590	3.84
39,000 spindles on No. 31¼, yarn produced ..... kilos..	927,000	871,200	6.01
Mechanische Baumwoll-Spinnerei und Weberei:			
Pieces produced ..... number..	445,670	423,960	4.87
3,000 looms, cloth produced ..... meters..	28,670,000	27,100,000	5.48
Haunstetter Spinnerei und Weberei:			
Pieces produced ..... number..	185,310	175,440	5.34
960 looms, cloth produced ..... meters..	11,537,000	10,955,000	5.07
Mechanische Weberei am Fichtelbach:			
Yarn worked ..... kilos..	1,120,000	1,042,100	6.95
1,210 looms, cloth produced ..... meters..	12,362,400	11,718,200	5.22
Baumwoll-Weberei Zöschlingsweiler:			
Yarn worked ..... kilos..	1,087,617	1,007,400	7.37
970 looms, pieces produced ..... number..	183,000	175,870	3.88

This shows that in these mills a decrease of the working hours from 11 to 10 or 9.09 per cent resulted in a decrease in the consumption of cotton of 6.02 per cent, a decrease in the production of yarn of 6.54 per cent, and a decrease in the production of cloth of 4.92 per cent.

[From Consul C. B. Hurst, Plauen.

ONE OF THE MANY SAXON WEAVING MILLS.

COTTON MILLS.

COST OF BUILDING A COTTON MILL—VARIOUS MATTERS INCIDENTAL TO FACTORY MANAGEMENT.

If the total number of spindles in Germany be divided by the total number of mills containing spindles, the average number of spindles per mill is 26,500. Data are furnished herewith in regard to the cost of building and operating a mill of 30,000 spindles. A concern at Mulhausen in Alsace has a capital of 18,000,000 francs ($3,474,000), and is the only firm in Germany that makes a complete line of cotton-mill machinery and that contracts to build and equip cotton mills ready for operation. This company is therefore the best authority on the cost of such mills. Its president furnishes the following data:

For a cotton mill of 30,000 spindles to spin warp yarns of say 27/29 French counts (equal to 32/34 English counts), and filling yarns of say 36/38 French counts (equal to 42/45 English counts), the cost of construction, without the ground itself, will range between 50 and 60 marks ($11.90 to $14.28) per spindle, complete. The cost will vary between these two extremes according to the outlay considered necessary for the house of the manager, the storehouses, and the accessories. Taking the average of 55 marks ($13.09) per spindle this amount will ordinarily be made up as follows:

Description.	Cost.	
	Marks.	*Dollars.*
Spinning machinery proper	25	5.95
Spinning accessories, cans, belting, etc	5	1.19
Steam engine, lighting and heating equipment	9	2.142
Building and sheds	12	2.856
Miscellaneous expenses	4	.952
Total	55	13.09

For a weaving mill of 500 looms the expense will be about 1,000 marks (mark=23.8 cents) per loom, viz:

Description.	Cost.	
	Marks.	*Dollars.*
Looms	400	95.20
Preparatory and sizing machinery, etc	50	11.90
Steam plant, lighting and heating	250	59.50
Building	200	47.60
Miscellaneous expenses	100	23.80
Total	1,000	238.00

In the foregoing figures the cost of the land is omitted as being too variable a factor to average, but for the ordinary German cotton mill located just outside of a town this might be estimated at 5 marks a square meter ($1.19 per 10.76 square feet).

NUMBER AND APPORTIONMENT OF OPERATIVES.

The wages paid in cotton mills in different parts of Germany vary, as also does the number of operatives required for a given number of machines or for a given production. For mills on similar goods and similarly located wages are lowest in Saxony and highest in Rhine. The mills around Augsburg seem to afford a fair average for the German industry as a whole. For a 30,000 spindle mill there is required under average conditions the following workers:

For general oversight: One obermeister (superintendent); one vorarbeiter (foreman) in the opening and mixing room; one meister and one untermeister (boss grader and second hand) in the card room; one spinnmeister (boss spinner) for every 10,000 to 15,000 mule spindles, and one throstlemeister (boss spinner) for every 10,000 to 15,000 ring spindles.

Mixing room: One man for every 6 bales daily, and one girl for every 12 bales daily, to pick and bundle the bagging and do similar light work.

Picker room: One man to every two openers, one man to every two pickers or lappers, one man for the waste machine, and one lap carrier for every 12 bales daily.

Cards: One card grinder to every 24 cards, one operative to every 8 cards, and one can girl to every 16 cards, the cards making 165 pounds in ten hours.

Draw frames: One girl to 16 deliveries for fine slivers, to make No. 30s and above, and one girl and an assistant for coarse numbers.

Fly frames: One operative to every 80 slubber spindles; one operative to 120 intermediate spindles on hank rove under No. 1.4—above this number there is required one helper to every two frames; one operative to every 144 spindle fine frame under $3\frac{1}{3}$ hank roving with the addition of one helper for every two frames making over No. 4 hank roving.

Mule spinning: For every two mules containing 1,800 to 2,000 spindles one spinner, two piecers, and two creelers, if on numbers under 20s; for finer numbers for a similar number of spindles one spinner, one piecer, and one to two creelers.

Ring spinning: One girl spinner to every 300 to 400 spindle warp frame on No. 20s; one girl for every 380 spindle frame on filling, with one young assistant for every two frames; for every two spinning frames one girl doffer.

There is required one engineer and one assistant in the engine room, one dynamo tender and one transmission tender and machinist, one fireman and one coal passer for every 200 horsepower, one head machinist and two assistants, one wood turner and carpenter, one gate keeper, etc.

The operatives per 1,000 spindles average between 6 and 8.

FUEL USED BY GERMAN COTTON MILLS.

The German cotton mills are mainly steam plants. Some of the mills in Bavaria and Baden, near Switzerland, including most of the mills at Augsburg, use water power, and a few in upper Franconia are operated either wholly or in part by water power, but with these exceptions the bulk of the mills are operated by steam. There are 97 square miles of lakes in the 29,000 square miles of Bavaria

nd the length of the rivers included in this Kingdom is 44,285 miles. n the highlands of Bavaria there is abundant water power available, stimated at over 300,000 horsepower, but this is as yet little utilized. ; is expected that the State will acquire the legal right to ex- ropriate vested rights in the more important rivers and streams and ill develop the water power for commercial purposes. Electricity beginning to be largely used in mills; at Plauen, for instance, very lace factory in the town is operated by current obtained from ie city power house.

Germany produces a considerable part of the fuel that it consumes nd also exports about 10 per cent of its production to neighboring ountries. Lignite is largely used in the form of briquettes.

Germany produces about 15 per cent of the coal output of the orld, and is the largest single producer after the United States and ie United Kingdom. The German production in 1907 was as fol- ws, in metric tons (2,204.6 pounds): Stone coal, 143,222,886; brown oal, 62,319,802; coke, 21,938,038; brown coal briquettes, 12,890,461; lack coal briquettes (pressed lumps), 3,524,017; total, 243,895,204.

The main coal basins for Germany are found at Ruhr in the Rhine rovince, in Upper and Lower Silesia, and at Bonn in the Rhine rovince. These three centers produce 55, 25, and 12 per cent, respec- vely, of the total; the remainder coming from Zwickau-Oelsnitz in axony, Zweibrucken in the Palatinate, Munich, Dresden, and Bay- euth.

The lignite is produced mainly at Halle, in the province of Saxony, nd at Bonn, in the Rhine province, these two places producing 66 nd 14 per cent, respectively, of the total, the remainder being ob- ained from Saxe-Altenburg, in Anhalt; Leipzig and Dresden, in axony; Braunschweig, Silesia, Magdeburg, and Hesse.

MILLS LOCATED NEAR FUEL SUPPLY—WHERE COTTON IS OBTAINED.

The old mills were located for water power, while the new are ocated with regard to the nearness of a fuel supply and for trans- ortation facilities. The coal mines of the Rhine region have had great deal to do with the increase of cotton manufacturing in the hine and Westphalian provinces, and similarly the coal mines in axony and Silesia have been of great advantage to the cotton and ther manufacturing industries of those sections.

Cotton is obtained by the German cotton mills through cotton rokers at Bremen and Hamburg, with smaller amounts through the orts of the Low Countries and Dantzig. Bremen is by far the largest otton import center on the Continent, and ships cotton not only to ll parts of Germany and to Austria and Switzerland, but as far in- nd as Moscow and northern Italy. It seems strange that any cotton hould be imported by Italian mills from Germany, but it is due o the fact that Bremen is the largest import center, and always has otton on hand ready for shipment as desired, and that there are many rokers from which to order, while there are few cotton brokers at enoa, and in the entries at that port there is frequently serious delay, wing to the congestion of the insufficient railway accommodations nland. During 1907 nearly 250,000 bales of cotton, valued at over 14,000,000, were supplied by German brokers to neighboring nations. here are large cotton storage warehouses at Bremen and the storage ate is low, so that many mills in different parts of Germany keep heir purchases stored here and have monthly shipments made as

needed, while the smaller mills buy in weekly or monthly lots from the brokers as desired. The brokerage charged is one-half of 1 per cent, paid in equal proportions by the buyer and seller. American cotton is imported on c. i. f. terms, 6 per cent, sixty days with 1 per cent weight allowance. Cotton is sold at Bremen for spot or future delivery, but there is no dealing in "futures" at Bremen and but little at Hamburg.

INLAND AND EXPORT FREIGHT RATES.

The inland freight rates on cotton from Bremen and Bremerhaven to the main cotton manufacturing centers of Germany and Austria are as follows per 100 pounds:

From—		To—	From—		To—
Bremen.	Bremerhaven.		Bremen.	Bremerhaven.	
Cents.	*Cents.*		*Cents.*	*Cents.*	
8.64	10.04	Munchen-Gladbach.	22.79	24.08	Augsburg.
16.52	18.58	Chemnitz.	26.82	27.97	Prague.
20.41	21.81	Mulhausen.	36.93	39.10	Vienna.

The following are the rates now (April, 1908) being paid by German cotton piece-goods exporters to the various countries of the world on piece goods exported from Bremen:

Destination and basis.	Rate.	Deviation from rate.
New York [a] per 35.316 cubic feet	$5.00	
Rio de Janeiro do	13.09	10 per cent rebate.
Montevideo do	9.52	Do.
Buenos Aires do	9.52	Do.
Valparaiso do	14.28	Do.
Mollendo do	14.28	Do.
Yokohama do	10.115	5 per cent rebate.
Hongkong do	10.115	Do.
Shanghai do	10.71	Do.
Singapore do	8.925	
Rangoon per 40 cubic feet	8.52	Plus 5 per cent primage.
Calcutta do	4.866	Do.
Bombay do	4.866	Do.
Alexandria per metric ton	9.733	Plus 10 per cent primage.
Smyrna do	9.733	Do.
Constantinople do	9.733	Do.
Athens do	9.733	Do.
Beirut do	10.95	Do.
Naples per 35.316 cubic feet	3.57	

[a] These rates are by mail steamers; by fast steamers the rates are $7.50.

TEXTILE PRINTING PRICES.

Mulhausen, in Alsace-Lorraine, is noted for its fine prints. I obtained while there the prices charged by three separate establishments for printing. These were as follows, per meter (1.09 yards):

Description.	Establishment A.	Establishment B.	Establishment C.
Cotton:	*Cents.*	*Cents.*	*Cents.*
32-inch goods, 1 and 2 rollers	3.11	3.97 to 4.46	3.8
56-inch goods, 1 and 2 rollers	5.60	5.97	6.4
32-inch goods, 1 and 2 rollers, using heavy colors with ground	3.32	5.52 to 6.22	4.1
Mousseline de laine, 30-inch:			
1 roller	3.85	4.72	5.4
1 roller, with heavy colors and ground	4.35	5.97	7.73 to 6.2
2 to 8 rollers	4.97 to 8.45	5.47 to 11.99	5.72 to 10.4
9 to 12 rollers	9.45 to 11.19	10.45 to 11.94	9.95 to 11.4

The rollers are furnished by the printer, the engraving design by the merchant with his cloth. The charges include the necessary bleaching before printing and the finishing and folding up after printing. Damaged pieces are charged half price.

It is interesting to note that very often German cotton piece goods, say prints, can be bought cheaper in foreign countries than at the price they are being retailed for in Germany.

RULES REGULATING WORK IN A GERMAN COTTON MILL.

The rules that are posted up in every German factory, according to the requirements of the law, throw a good deal of light on the methods of work in the different sections. The following are the rules of one big German cotton mill, and are taken from a recent publication by a French authority, who wrote a report on German factories, but are similar to rules I have seen in factories in Saxony and Westphalia:

1. Every worker on his admission to the factory receives a copy of these regulations and must sign a declaration showing that he has received this copy and accepts the conditions as a contract of work according to the provisions of the law.

2. Anyone desiring to obtain work at the factory must first show a quittance from the invalidity insurance fund and the certificate of dismissal from the last establishment at which he worked (minors must show their record book). He must be examined by a doctor and the admission is temporary only for two weeks. At the expiration of two weeks and on a certificate from the doctor showing his state of health he may then be accepted by the management, and is enrolled as a member of the sick fund. In the case of apprentices their fathers or guardians must sign the contract.

HOURS OF WORK—CONDUCT OF EMPLOYEES.

3. The regular hours of work are from 6 in the morning to midday and from 1 o'clock to 6 in the evening; on Saturdays and the eves of holidays to 5 in the evening. Women who have households to manage may on demand quit at 11.30 o'clock in the morning. The hours of work and the rests allowed minors are shown by paragraphs hung on the walls of the workroom. Adults are not entitled to these rests. The commencement and the end of work hours are announced by signal.

4. On Sundays and legal holidays the factory does not run. Adult employees may be held to perform, after the cessation of work and on Sundays and holidays, such special work as is authorized by law.

5. It is forbidden to enter or leave the factory by other than the regular entrances. The gates are opened fifteen minutes before the commencement of work. It is forbidden for women and children to commence any work before starting time. Those tardy and those leaving before the stoppage of the machines are punished by fine. Leaving during the hours of work is not allowed except by the authorization of the superintendent and this authorization carried to the gate keeper.

6. Obedience is due to superiors and the work prescribed must be executed with good will. It is forbidden to make a noise in the halls or to assault a fellow worker. When a worker presents himself at the mill in an intoxicated condition he loses his work and salary for that day; on a repetition of the offense he is discharged. No worker has the right to enter rooms other than that in which he works. During the midday rest and after work no worker has the right, unless by special authorization, to remain in the factory. Machines and appliances used by a workman must be kept in good order. Modifications or repairs must only be made by the foremen or on their direct orders. It is forbidden to introduce strangers into the factory.

PRECAUTIONS AGAINST ACCIDENTS—CARE OF PROPERTY.

7. The rules shown on the wall as to precautions to be taken to avoid accident must be followed strictly for the interest of the worker. It is strictly forbidden to clean machinery or shafting while in motion. Each worker is

held to certify by his signature that he will take notice of these precautions to avoid accidents.

8. Workers must take care of all material delivered to them and must gather up and deposit waste made in the places provided. It is forbidden to take away any object, however valueless, waste or anything else, and workers must allow themselves to be examined if such is found to occur. Offenses will be submitted to the courts. To throw cotton, waste, etc., in the cabinets or on the street will be considered as damage within the meaning of the law of work.

9. Water-closets and their surroundings must be left in good order. Clothes and baskets brought to the factory must be kept in their proper places. It is forbidden to smoke in the factory or the courtyards, and it is forbidden to carry matches in the pockets within the factory. Pipes, lanterns, and matches must be left with the gate keeper, who will take care of them. Everyone must observe these precautions carefully to avoid danger of fire, and any disregard of these rules entails the immediate exclusion of the offender without appeal.

10. Food and drink must not be introduced into the workrooms except at the prescribed hours—that is, from 8 to 8.30 o'clock in the morning and from 3.30 to 4 o'clock in the afternoon. It is absolutely forbidden to bring brandy into the factory. Any traffic or collecting, etc., is absolutely forbidden, and after one warning results in dismissal.

PAYMENT OF WAGES AND FINES—QUIT NOTICES.

11. Wages paid are determined according to the tariffs shown on the walls. Weavers are paid per cut. The fines levied for deterioration of merchandise or damage to other objects through the negligence or by the fault of the worker are deducted from their pay and given to the sick fund.

12. Accounts are made up every fortnight on Saturday evening and are paid the next Saturday, with the deductions authorized by law. The worker must verify his wages and make any claim immediately, for later claims will not be allowed, so as to avoid the mixing of strangers into matters concerning the wages of employees.

13. In case the factory is not able to run and the management has thereby to refuse work to the operative, the factory can not be held liable for damages, such stoppage being due to accident to the motors or similar cause. As far as the law permits such time will be made up by extra work overtime.

14. The operative can not claim payment for hours that he did not work, even though it was not due to his fault.

15. Two weeks' notice of termination of contract may be given by either employer or employee, but such notice must be given on Saturday, when the accounts are made up, at the office between 4 and 5 o'clock in the afternoon. The notice will be better if signed by a superior and given to the worker at the hour named, or given by the worker to the office, as the case may be. Quitting work at the factory without due notice or valid excuse is held to be a breach of contract, and in accordance with the law of work there will be retained a week's wages to be turned over to the sick fund, and a civil action may also be instituted in the courts if considered advisable. Besides the provisions of the law of work, disregard of the regulations for avoiding accidents entails immediate discharge without notice.

PUNISHMENT FOR OFFENSES—EMPLOYEES' PENSION FUND.

16. Offenses committed under the present regulations or under the provisions of the law of work may be punished by fines. Separate fines can not exceed half a day's wages, except that acts of violence against his inferiors or fellow-workmen, rudeness toward his superiors, grave impropriety, and offenses against order may be punished by a fine equal to a day's wages. Usually for the less serious cases the offender is first only warned, on repetition he is fined. The obligation to pay fines levied is not annulled by the fact of giving notice. All fines deducted from the wages go to the sick fund.

17. All fines and deductions are fixed by the foreman of each room and notification given to the worker. He has the right to appeal to the superintendent, who finally decides.

18. Any worker can be admitted to the pension fund founded for the benefit of the operatives after five years of service if there is no opposition to his admission. The premiums for this fund are paid by the factory at their own cost without any deduction from wages. Payments may be made to a savings

fund, which pays 4½ per cent interest. Deposits may be made of from 1 to 30 marks (23.8 cents to $7.14) a week. When an account reaches over 1,000 marks ($238) the rate of interest is decreased or the total deposit is returned.

19. These regulations, drawn so as to conform to the law, after having been brought to the attention of the regular workers' committee of the sick fund, were submitted to the higher authorities, approved by them, and will be enforced strictly.

GOVERNMENT REGULATIONS.

In Germany there is no law limiting the hours that may be worked by men, but there are numerous detailed provisions in regard to the employment of women or children, the conditions of employment, holidays, payment of wages and fines, protection from accidents, etc. The general law was passed July 26, 1900, and stricter provisions added December 16, 1907. The following extracts from the law are reproduced to show under what legal conditions German cotton mills operate:

Contracts may be freely made between employers and employees, and these contracts are legal unless they violate some provision of the law. The operative is not compelled to work on Sundays or holidays, and factories are forbidden to run on such days. Holidays are fixed by the authorities of each province according to the local customs, but the Government prescribes at least forty-eight hours each for Christmas, Passover, and Pentecost. New Year's Day, Easter Monday, Ascension Day, Whit Monday, and Repentance Day (middle of November), are usually given, and in some sections many more, including dates connected with the birth and the accession of the ruler. Operatives may be employed on Sundays and holidays at the works where specially permitted by the authorities. These special cases include urgent work in the public interests, to take inventories prescribed by law, for repair and maintenance work difficult to effect during the week, for work impossible to effect during the week and the nonexecution of which would injure the goods, and for the inspection of the work done during the week.

EMPLOYEES' RECORD BOOKS AND CERTIFICATES.

Each worker under age must have a record book, in which is given his name, date and place of birth, the name and residence of his legal representative, and the signature of the worker. This book is signed and stamped by the authorities and is retained by the employer until the expiration of the contract made by the worker, when it must be returned to him. When the worker enters the factory the employer must write in ink the date and the nature of the employment, and when the employee quits the employer must write the date; also any change of class of work in the meantime and the last class of work performed. Observations advantageous or disadvantageous to the worker are forbiddden.

On his departure a worker may demand a certificate relative to the duration and nature of his work. If the worker demands it, the certificate must also mention his conduct and his services. It is forbidden for the employer to draw attention to the worker by adverse remarks or by marks made on the certificate or to give in regard to the worker any other report than that given in the text of the certificate.

PAYMENT OF WAGES AND FINES—COMPLEMENTARY INSTRUCTION.

Wages must be paid in currency or legal tender, and must not be paid on Sundays. It is forbidden to furnish merchandise on credit in lieu of wages with the exception that food and combustibles may be furnished at net cost and lodgings furnished at the customary local rents and payments for these deducted from the wages due. Workers' wages can be retained as indemnity for damages caused by an infraction of the contract, but must not exceed more than one week's wages at the fortnightly settlement, except in case of acts against fellow-workmen, of offenses against morality, or against regulations for the maintenance of order and security, and for the fulfillment of statutory provisions. In these cases fines may be imposed to the full extent of

the wages due. All fines must be applied to the benefit of the factory workers and usually go to the sick fund, but this does not affect the right of the employer to obtain legal compensation for damage. Particulars of all fines must be entered by the employer in a book, which is open to inspection by a Government officer.

Where there are any workers under 18 years of age liable according to the law to attend a complementary course of instruction at schools under the care of the State or the community the employer is obliged to grant such young workers the time necessary for this study and the time required is fixed by the administration. This includes also complementary instruction to females by lessons on sewing and the care of a household.

HYGIENE AND SAFETY.

The employer is responsible for seeing that the workrooms, motors, machines and appliances are arranged so as not to endanger the health or life of the employees. Especially there must be good light, sufficient space, arrangements to renew the air, and to carry away the dust, lint, waste, etc., resulting from the work. All moving parts of machines must be protected from the workers by covers, and all measures of precaution must be taken to avoid dangers inherent to the work, comprising the danger from fire. The employer must have regulations and instructions assuring the conduct of the work in a manner exempt from danger. The employers must maintain these regulations and they are required to see that their operatives keep order and act with propriety and morality. It is specially recommended wherever the nature of the work permits that the sexes be separated at their work. Separate clothes rooms, toilet rooms, etc., must be provided for men and women. Such rooms must be installed in sufficient numbers for the number of workers employed and according to the laws of hygiene. Where youthful workers are employed the employer must keep a special watch over them, to see that they keep the laws of hygiene and good manners necessary for their age. In certain cases the police are directed to inspect plants and direct alterations, such as providing halls in cold weather for the workers to take their meals in, etc.

CONTRACTS BETWEEN EMPLOYER AND EMPLOYEE.

Contracts between employer and employee shall ordinarily include a provision for two weeks' notice before the contract is terminated, but by special arrangement between employee and employer this notice in regard to termination of employment may be of any duration desired, but it must be equally binding on both.

The worker may be discharged without the notice required by his contract only under the following circumstances: False representations of the worker in making the contract; theft or other criminal acts; leaving work without permission or refusing to fulfill the contract; carrying fire or lights about contrary to order; acts of violence or gross abuse directed against his employer, his family, or representative; willful damage to property of employer or fellow workmen; inducing members of the employer's family or his representative to behave in a manner contrary to law or morality; inability to continue work on a contagious disease. In such cases there is due to the worker no indemnity, but in the first seven cases he can not be summarily dismissed without a first warning if the facts in question have been known to the employer for over a week.

The operative may quit before the completion of his contract in the following cases only: If he is incapable of continuing work; gross abuse by employer or his representative against the worker or members of his family; the inducing by employer or his representative, of members of the worker's family to behave in a manner contrary to law or morality; nonpayment of wages in the prescribed manner; if the continuation of the work is dangerous to the health or life of the worker in a manner not included in the contract; unjustifiable prejudice; neglect to provide sufficient work for pieceworkers.

An employer who engages a workman knowing that he has not fulfilled his contract with his former employer or who entices him away from such employer is liable for damages therefor.

POSTING OF REGULATIONS—EMPLOYMENT OF CHILDREN.

There must be hung up in conspicuous places in every factory the rules under which the factory is operated, stating the hours of work, the intervals for meals, the time and manner of paying wages, the length of notice required for

terminating work, and the conditions which render notice unnecessary, and particulars of punishments, including fines and the objects to which they are to be applied. Before promulgating any rules they must be submitted to a committee of the workmen for consideration, and then with any written amendments or objections from them submitted to a factory inspector and be approved or amended by him before issuing. After promulgation the rules are binding on both employer and employee.

It is forbidden to employ children under 13 years of age. Children under this age are compelled to attend school. Between 13 and 14 years of age they may be employed if an inspector decides that they are no longer liable for school, but in this case they can not be employed over six hours a day. Youthful workers between 14 and 16 years of age can not work over ten hours a day. They must not be employed before 5.30 o'clock in the morning nor later than 8.30 o'clock at night. They must have regular periods for rest. The children who work six hours must have at least a half an hour pause. Youthful workers between 14 and 16 must have at least an hour at midday and a half hour in both forenoon and afternoon. If they do not work over eight hours a day the short rests may be omitted if there is no continuous period of work over four hours. During these rests they are forbidden to stay in the factory and should be out in the open air.

EMPLOYMENT OF WOMEN—OVERTIME WORK.

Women must not be employed in the factory at night between 8.30 and 5.30 o'clock, nor on the days before Sundays and holidays after 5.30 o'clock p. m. Women over 16 can work up to eleven hours a day, but not longer, and not over ten hours a day on Saturdays and the days before holidays. After January 1, 1910, according to the law just passed, women can not work over ten hours a day. Women who have households to manage can leave a half hour before the midday stopping time, unless the midday rest is at least an hour and a half. Women who are accouched are forbidden to work for four weeks thereafter and only within six weeks on a doctor's certificate.

When an employer engages a worker under 16 he has to hand a written notice to the police, giving the hours of work, the time at which they commence and stop, the hours for rest, and the nature of the occupation. A copy of the law as it relates to work by minors must be posted up in rooms where such minors are employed.

In case of urgent work and on demand from the employer the administration can authorize operatives over 16 to work as long as thirteen hours a day and up to 10 o'clock at night for two weeks. After January 1, 1910, the new law limits overtime to twelve in place of thirteen hours. This authorization can not include more than forty days in one year for any one factory. Authorization to work overtime more than two weeks running can only be given by the higher authorities, and more than forty days is only allowed in case the total number of hours per year, divided by the total number of days worked, does not exceed the maximum fixed by law—that is, eleven hours for adult women. The demand must be made in writing and a reply given within three days. In case of the interruption of work by flood, fire, or accident, there may be overtime worked for four weeks by permission of the higher authorities; for longer than that only by special permission of the chancellor.

GENERAL REGULATIONS.

There is no legal regulation of the hours of work for men, but for women it is eleven hours, except on Saturdays and days before holidays, when it is ten, and as there are a large number of women employed in the factories, this practically fixes the working hours of the factory. Since the first part of 1906 there have been a large number of mills running only ten hours a day instead of the legal eleven, partly because of demands made by the unions and partly from the altruistic attitude of some employers, which have forced others to follow to retain their workers. The real time is less than the nominal time by from a half to three-fourths of an hour, as women are allowed to leave a half hour before midday, and this can not be counted against them, and in some cases the afternoon rests are not deducted. Under the restrictions imposed by the new law with regard to women, etc., all German cotton mills in 1910 will be forced down to sixty hours a week as the maximum. Factory inspectors of the Imperial Government are appointed to see that the law is carried out, and factories where women or youthful workers are employed must be visited once every six months. A few of these inspectors are women.

EMPLOYEES' COMPULSORY INSURANCE.

WORKING PEOPLE PROTECTED AGAINST ILLNESS, OLD AGE, AND ACCIDENT—PROVISIONS OF THE LAW.

Paternal laws have been enacted in Germany of more far-reaching character than those enacted by any other nation, and prominent among such laws are those in regard to compulsory insurance of workmen. Compulsory insurance applies to all workers in Germany, textile or otherwise, and some understanding of its ramifications is necessary in contrasting the position of both mill owner and operative in Germany with those of other nations. Every worker, whether male or female, who receives under $476 a year, has to insure against sickness and against old age or invalidity, and has to be insured by his employer against accident.

Sick insurance provides against temporary illness during a period not to exceed twenty-six weeks. Old age and invalidity insurance provides for prolonged illness after twenty-six weeks and for permanent incapacity through chronic infirmity or old age. Accident insurance provides for relief during temporary disablement, permanent support in serious disablement, burial expenses, and assistance to widows and orphans in case of death.

Of the sick insurance two-thirds is paid by the employees and one-third by the employers; of the old-age and invalidity insurance half is paid by the employees and half by the employers, while the accident insurance is borne by the employers alone. The sick insurance premium varies between 2 and 4 per cent of the wages paid, and the old age and invalidity premium amounts to about 1 per cent of the wages paid. The portion of this burden borne by the employee is therefore not heavy, but is nevertheless felt.

The law in regard to compulsory insurance against accidents was enacted July 6, 1884, and this was followed December 1, 1884, by the law in regard to compulsory insurance against sickness. On June 23, 1889, there was passed a compulsory law in regard to old age and invalidity, and this law was amended to its present form July 13, 1899.

SICK INSURANCE.

This law has been modified three times since its inception, the last time in 1903. Every German worker, of both sexes, receiving under $476 a year must be insured against sickness, but this insurance may be either public or private. In the factories all workers are in-

scribed as members of the sick insurance fund, unless they produce testimony that they are insured in a private company that meets the requirements of the law. At every pay roll two-thirds of the premium required is retained by the company and added to the one-third paid by the company is turned over to the sick fund.

A good many factories pay two-thirds of the premium and only leave one-third to be paid by their employees, but it is illegal for the employer to pay over two-thirds. In some few factories where the sick fund has been long established there is an accumulated fund, and the interest from this fund reduces considerably the premium to be paid. In other factories where there has been more sickness it sometimes happens that the full amount allowed by law does not suffice, and in this case the factory usually makes up the deficit voluntarily.

COLLECTION AND DISTRIBUTION OF FUNDS—SPECIAL INSURANCE.

The funds of the sick insurance are collected and distributed in each district by trade associations of that district. A meeting is held by each association at least once a year and a committee appointed to control the collection and distribution of the funds. The meeting is composed of delegates elected by the workers, usually to the number of 5 or 10 per cent of the insured that they represent, and the employers are represented in both meeting and committee according to their proportionate contributions, each factory being represented. The regulations, after consultation with all interested, are laid down by the meeting and approved by the higher board of management. This institution has legal personification and considerable powers of self-government, though under the superintendence of the State. Disputes are settled by local boards of arbitration formed in each district. For the furthering of their mutual interests several sick-fund institutions can form themselves into cooperative associations.

District sick insurance is an enlarged arrangement for complying with the demands of the law regarding compulsory insurance. All those belong to the district sick insurance who are not provided for in the other admissible forms of sick insurance. The management of the district sick insurance is undertaken by the representatives of the district. Under certain conditions a mutual sick-fund association can be formed for several districts.

Membership in special sick insurance institutions, such as registered charitable funds associations, builders' sick funds, etc., which comply with the requirements of the law, release one from the ordinary sick-insurance funds.

Factories may set up a special sick fund for their own employees if the number of such employees are over 50, and this becomes obligatory on the request of the district board of management or of the sick institution to which the workmen belong. The employers can also be forced to form such a sick fund among their employees if there is good reason to fear special danger of illness in their factories.

CLASSIFICATION OF OPERATIVES—MEDICAL TREATMENT AND BENEFITS.

As every worker is enrolled on some sick insurance fund, this means that before employment in Germany every worker has to be physically examined. He is then tentatively engaged, but the en-

gagement is not considered binding until after two weeks' trial. If he is found to be incapacitated from work or suffering from any disease, then the sick fund to which he belonged at his last place of work is compelled to charge themselves with his relief or he has to be looked after by the sick fund of his community.

The operatives are divided into eight classes, according to their wages per day, the first class having an average of 1 mark (23.8 cents), the second of 1.50 marks (35.7 cents), and so on to the eighth class, which has an average of 5 marks ($1.19) a day. The sick benefit amounts to 50 per cent of the wages of the class to which he belongs, and is thus 50 to 250 pfennigs (11.9 to 59.7 cents) per day. In special cases this indemnity is allowed to be raised to three-fourths of the average wages of his class.

In case of sickness there is furnished gratuitously on the first day free medical treatment, with medicines, medicaments, bandages, spectacles, trusses, or other appliances that will enable the patient to continue at work or to hasten his cure. After three days there is rendered sick-benefit wages. This indemnity is payable every Saturday, and continues as long as the illness lasts, if not over twenty-six weeks. The sick-fund assistance ceases at the latest at the expiration of the twenty-sixth week after the commencement of the sick payment. For continued illness after twenty-six weeks, whether temporary or permanent, the burden rests on the old-age and disability fund.

TREATMENT OF SPECIAL CASES.

In case of illness for which the patient himself is to blame, as, for instance, through fights, blows, drunkenness, etc., the associations or communities are to decide for themselves whether sick payment shall be rendered at all or partly.

In case of maladies that it is impossible to treat advantageously at home, especially in the case of contagious diseases, the committee of the sick fund may have the patient treated at a hospital. In this case, if the patient is a single person, he only receives one-fourth of the sick benefit he would otherwise be entitled to, but is under no expense at the hospital. In the case of a married man, having a wife or family dependent on him, he may receive the full benefit as if treated at home, if circumstances justify it. In the Rhine province and some other sections the patient has the right to choose his own doctor.

Women accouched receive sick benefit for six weeks. They are not allowed to work for four weeks and not until the full six weeks, unless on a doctor's certificate.

DEATH BENEFITS—PREMIUMS AND TOTAL RECEIPTS.

In case of the decease of a member of the sick benefit fund his family receives an indemnity equal to twenty times the average daily wages of the class to which he belonged, this indemnity therefore ranging between 20 and 100 marks ($4.76 and $23.80). Some sick funds give also in case of the decease of members of the family of one of their contributors.

The maximum sick fund premium is fixed by law at 4 per cent of the wages, of which the employee is to pay two-thirds and the employer one-third, but the premium is usually 2 or 3 per cent.

The total receipts yearly by the sick funds amount to some 250,000,000 marks ($59,500,000) and the expenditures to nearly as much. The largest expenditure is for sick indemnities to workmen, amounting to nearly one-half of the total, then for doctors, then, in their order, for medicines and appliances, hospitals and clinics, payments to widows and orphans, etc.

INVALIDITY AND OLD-AGE INSURANCE.

Persons compelled to take this insurance are all workers of 16 years of age and upward, such as workmen in factories, laborers, daily paid workmen of all kinds, servants, journeymen, clerks, overseers, foremen, private teachers (with salaries under 2,000 marks, or $476), technical experts, etc. The exemptions are invalids, persons entitled to pensions, as, for instance, teachers employed by the State, etc., persons who do not work for regular wages but temporarily tender services from time to time, and those who obtain their board and lodging as payment for their work. On request the following persons can be exempted from this insurance: Those who already draw pensions or accident premiums, those over 70 years of age, those who are not employed more than twelve weeks a year for wages; the latter, however, must have been already insured for at least one hundred weeks. The applications for release must be presented to the authorities in writing, and such persons receive a green card signifying their release from compulsory insurance. Compulsory insurance extends to those following a household occupation in the tobacco and textile industries.

PREMIUMS AND METHODS OF PAYMENT—CLASSIFICATIONS OF INSURED.

The payments of invalidity and old-age insurance premiums is divided equally between employer and employee, and it is a misdemeanor for the employer to pay more or less than one-half. Every insurer is supplied with a pocketbook containing a card available for one year. The card and the book give the name and the occupation of the insured. The card has lines for the inscription of the days of sickness and of military service. It is divided into 52 squares, destined to receive 52 stamps each of the value of the weekly contribution. Each week a stamp must be bought and pasted in, and this must be defaced by writing thereon the date. These stamps can be bought at the post-office or at certain special bureaus.

Usually the employer deducts half the premium, pastes in the stamp for the full amount, and then returns the book to the employee. The employer is forbidden to retain the book after pasting in and defacing the stamp. When there have been 52 stamps put in, filling all the squares, the book is turned in and another one furnished. There is allowed a maximum delay of two years in the filling in and delivery of the card before the workman loses his insurance rights. Weeks during which the employee was sick or in military service count as weeks of payment without pasting in any stamps, but a certificate must be furnished to prove sickness. Also women accouched are allowed to count six weeks without stamps as payment weeks.

The insured are divided into five classes according to wages received, as follows:

[100 pfennigs=1 mark; 1 mark=23.8 cents.]

Class.	Annual wages.	Weekly payments.	Class.	Annual wages.	Weekly payments.
	Marks.	*Pfennigs.*		*Marks.*	*Pfennigs.*
First	Under 350	14	Fourth	850 to 1,150	30
Second	350 to 550	20	Fifth	Above 1,150	36
Third	550 to 850	24			

RETURN PREMIUMS—TREATMENT ACCORDED THE INSURED.

Half of the premiums paid are returned under the following conditions: In case of the death of the insured after he has paid at least two hundred weekly premiums; in case of invalidity due to accident, if the contributions paid for insurance against accident are more than those to which the insurance against invalidity have given the right, and the assured has paid at least 200 premiums; in case of the marriage of a woman who has paid at least 200 weekly premiums.

Temporary illness up to twenty-six weeks is a charge on the sick insurance fund. After twenty-six weeks it becomes a charge on the old-age and invalidity insurance fund, and the patient has the right to all attendance, medicine, and appliances that may tend to effect a cure, such as massage treatment, treatment with special baths, operations from time to time by specialists, treatment in hospitals, sanitariums, houses of convalescence, etc. In cases of tuberculosis they are transferred to special tuberculosis sanitariums and given open-air treatment, etc. Convalescents are given food suitable to their case, even at their homes. If their illness incapacitates them for their former occupation they are maintained during their apprenticeship at another trade to which they may be suited. In this way many workers are prevented from becoming a permanent charge on their relatives or the State, and enabled to become able to again sustain themselves either wholly or in part.

YEARLY REMUNERATION OF THE INVALID AND AGED.

The yearly remuneration received by an invalid is divided into three parts: A fundamental sum corresponding to the class in which he was insured based on his regular wages; a sum that is obtained by multiplying the number of weekly payments made by a weekly coefficient fixed by law; a fixed indemnity, furnished by the Government, which runs from 50 to 62 marks ($11.90 to $14.76). The fundamental sums and the weekly coefficients for the five classes previously noted are as follows:

Class.	Fundamental sum.	Weekly coefficient.	Class.	Fundamental sum.	Weekly coefficient.
	Marks.	*Pfennigs.*		*Marks.*	*Pfennigs.*
First	60	3	Fourth	90	10
Second	70	6	Fifth	100	12
Third	80	8			

For example, suppose one has paid 800 weekly premiums of class 4 and then becomes incapacitated for work he will receive the following: The fundamental sum of class 4, 90 marks ($21.42); 800 payments of class 4, 10 pfennigs per payment, 80 marks ($19.04);

indemnity from the Government, 50 marks ($11.90); total yearly return, 220 marks ($52.36). In this case the insured after working sixteen years had paid 120 marks ($28.56) (the other half having been paid by his employer) and on becoming incapacitated for work, which might be at the age of 33, if he started work at 16, he receives for the balance of his life 220 marks ($52.36) a year.

In regard to old age the conditions are: (1) Having attained an age of 70 years; (2) having paid at least 1,200 weekly premiums, which would take twenty-four years. As the law was only promulgated in 1889, to take effect January 1, 1891, there has not yet been any entitled to the old-age pension under the second condition. For all persons who were over 40 years of age when the new insurance came into effect at the end of 1890, the waiting time of 1,200 payments is shortened by as many years over forty as they were at that time, and in this case the year is considered to be of forty payment weeks. For example: A worker born in 1830 attained his seventieth year in 1900. He was 60 years old in 1890, or twenty years over the forty noted as the minimum. His waiting time was reduced from 1,200 by 800 weeks, leaving him only 400 weeks to pay.

The yearly sum paid as old-age pension is calculated on the basis of the number of weekly premiums paid times a coefficient fixed by the national administration for each class. The following are these coefficients: Class 1, 60 marks; class 2, 90 marks; class 3, 120 marks; class 4, 150 marks; class 5, 180 marks.

GOVERNMENT INDEMNITY PAYMENTS AND RECEIPTS.

In addition the Government adds a fixed indemnity of 50 marks ($11.90). For example, suppose a worker born in 1835: He was 55 years old in 1890, and in 1905, when he became 70 years old, he demands an old-age pension. He has made 700 weekly payments, of which 100 were in class 3, 200 in class 4, and 400 in class 5. The payments in the lowest class are disregarded by the law, so his total payments under classes 4 and 5 amount to 1,020 marks ($242.76), and this divided by 600 to obtain the average, which is found to be 170 marks ($40.76). Add to this the 50 marks ($11.90) of the Government and we obtain 220 marks ($52.36) as the yearly old-age pension to be paid in this case. To obtain this yearly pension the worker has paid 100 premiums of 12 pfennigs each, 200 premiums of 15 pfennigs each, and 400 premiums of 18 pfennigs each, or a total of 114 marks ($27.13) only. This is only half the sum that has been received as premiums by the Government, as it will be remembered that the employer pays the other half.

The sum received by the Government yearly for the old-age and invalidity insurance amounts to some 200,000,000 marks ($47,600,000), of which part is premiums and part interest on funds on hand and investments. The yearly distribution amounts to only about 150,000,000 marks ($35,700,000) a year, so that there is a yearly increasing surplus, which at present amounts to over 1,000,000,000 marks ($238,000,000), and this is exempted by law from being drawn on for any other purpose than that for which it was paid in. In 1914, when the second clause of the old-age pension comes into effect—that is, of men being entitled to a pension who have paid in premiums regularly for twenty-four years—there will undoubtedly be a large draft made on this surplus.

POPULARITY AND GOOD EFFECTS OF THE LAW.

The old-age and invalidity insurance is very popular in Germany, and when the law was modified and extended in 1899 all classes voted in its favor, so that it was almost unanimously adopted. One effect it has had that is very noticeable from the statistics, viz, the decrease in the death rate. There is hardly any doubt but that this decrease is due to this law, especially the decrease in deaths from tuberculosis. The ordinary workman, relying on his own savings, is not able to secure treatment necessary to effect a cure, but under this law he obtains this free, and the large number of special sanitariums and hospitals erected by the Government for the treatment of special diseases have saved many lives, while the oversight exercised by the insurance funds over the worker, by checking illnesses at the start, have saved many more. The associations, in furtherance of the health of the operatives, have invested large amounts from their surplus funds in erecting sanitary homes for the workers, and this also has been of great benefit.

The old-age and invalidity insurance funds are administered by special associations and institutes which are established for large districts or for whole States. Each has a president, who has the standing of a Government official, and an executive committee composed of an equal number of employers and employees, not less than five of each. The employees are not only represented on the district committee, but on the central board and in the tribunals of experts. Each district has at least one arbitration board, with an independent chairman, nominated by the Government, and assessors representing equally employers and employees. General supervision is exercised by the imperial insurance office.

Persons insured can choose a higher class than that to which they belong should they undertake to pay the extra cost. Optional insurance is possible in all grades of wages.

ACCIDENT INSURANCE.

Insurance against accidents in Germany is a special organization and is a mutual insurance among employers. Groups are formed of the employers in certain industries in specific localities. Thus cotton and woolen manufacturers are placed together and are divided into five groups: South Germany, north Germany, Saxony, Silesia, and Prussian Rhine and Westphalia. All workers must be insured by their employers if such workers make under 3,000 marks ($714) a year, the annual wages being calculated as 300 times the daily wages.

The five textile associations, composed of all the cotton and woolen manufacturers in their respective districts, are legally incorporated bodies and have considerable powers of self-government. They fix their own regulations, and these are carried out by a duly appointed committee, but they are under the supervision of the imperial authorities. The committee is usually appointed for six years, and one-third of the members are renewed every two years. They fix the amount of indemnity in case of accidents, give orders to factories to install safety appliances, such as coverings for machines, etc., and can levy fines on factories which do not obey such orders. They decide on what measures are to be taken to fix the blame for an accident, direct what treatment is to be received by the injured, etc., and have the entire control of the receipts and disbursements of funds.

PROVISIONS, OPERATIONS, AND BENEFITS.

The workers are not members of this association as they pay nothing toward it, it being entirely supported by the employers. The injured man, however, is supported for the first thirteen weeks at the cost of the sick-insurance fund to which the workers belong, and from which he receives a fixed daily indemnity. After the thirteenth week the Employers' Accident Association takes charge of the case.

In case of an accident the employer has immediately to notify the police and the accident association in writing. He has three days in which to make this declaration. The injured man is taken in charge by the sick fund and for the first four weeks receives one-half of his regular wages and from then up to the end of the thirteenth week two-thirds of his regular wages, the sick fund paying one-half and the employer one-sixth.

If the injured man is treated at a hospital and is married, he receives one-fourth of his regular wages up to the end of the fourth week, and then one-third up to the end of the thirteenth week. He is then under the care of the Employers' Accident Association, and this association may request the sick fund to continue the treatment at its charge or it may take charge of the case itself. In this latter event the patient is specially examined by doctors. If judged necessary for his cure, he is sent to special baths, to mechanical-therapeutical establishments, to convalescent houses, etc. He is then examined anew and the degree of his incapacity is stated in percentage of total incapacity for work. If totally incapacitated for work he receives two-third of his regular wages, and if partially incapacitated, from 5 per cent up, according to the degree of incapacity stated by the doctors in percentage. When not only incapacitated from following his trade, but totally helpless, he may receive the full amount of his regular wages. When out of work, in consequence of the accident, either part or full wages are paid, according to circumstances.

RIGHT OF APPEAL FROM INDEMNITY ALLOTMENT.

The injured man has a right to appeal if he thinks the percentage stated by the doctors, and hence his consequent indemnity, too small. Also at any time for five years after the accident he has a right to demand increased indemnity if his incapacity increases, and, vice versa, the association has a right to cut down his indemnity if there is noted an improvement in his condition, such questions to be legally decided by boards of experts. After five years there can be no change without special authority from those higher up.

The indemnities are payable by post monthly in advance. The funds necessary are supplied by assessments levied on the members of the association based on the expenses of the preceding year. If all the employers are in industries with equal risks the assessment is the same for each, proportionate to his total wages paid. This is never the case, however, and each association fixes the percentage to be paid by each branch of the industry according to the percentage of accidents that their records show to come from this branch. Thus in cotton manufacturing most factories show the largest percentage of accidents to be from the electrical installations, then spinning plants, then bleaching, dyeing and finishing, then twisting plants, then weaving, then knitting, etc. The percentage to be paid by each

manufacturer on his total wages is thus fixed according to whethe he has spinning only or spinning and twisting, etc., being mathe matically computed according to the ascertained coefficients, an these coefficients being changed each year according to the propor tion shown by the preceding year.

APPORTIONMENT OF ASSESSMENTS—PAYMENTS TO FAMILY OF ASSURED.

It has been found in practice that there is rarely any great varia tion in these coefficients—that is, in a certain district the proportio of accidents from spinning mills, from weaving mills, from dy works, from knitting mills, etc., will be found to show a remarkabl conformity year after year, unless there is some important chang made in the methods of work. Where one mill shows a much highe proportion of accidents than the average, this mill has its dange coefficient increased correspondingly, and the committee examines th mill to ascertain the causes of such accidents and may order specia safeguards provided where found necessary. For spinning mills th ordinary assessment will be about 1 per cent of the total wages whereas for weaving mills it is usually not much over one-half of per cent.

In case of death from accident the family of the assured receives Burial money equal to one-fifth of the average annual wages, an this sum must not be under 50 marks ($11.90); the widow is paid yearly allowance of 20 per cent of the annual wages of the deceased until her death or remarriage, and two children under 15 years o age may receive 20 per cent each until they reach the age of 16; i there are other dependent relatives they may also get 20 per cent i in want, but the total allowance must not exceed 60 per cent. A widow who remarries receives one payment of 60 per cent in full o all claims on the fund.

If it is proved that the accident was voluntary on the part of th worker he gets nothing, and there are severe penalties if a patient i found to be exaggerating his injuries to obtain a larger pension Also, if an accident is due to the culpable carelessness of the employe in neglecting proper precautions then he is liable for all damage and the association is not held responsible.

TRADE ORGANIZATIONS.

ESTABLISHMENT AND OBJECTS OF WORKMEN'S UNIONS—ORGANIZATIONS AMONG THE EMPLOYERS.

In 1731 organizations of workmen in Prussia were absolutely forbidden by law. This law was partially repealed in 1848, but soon put in force again, and was not finally abolished until 1868. They then increased rapidly, and as many were socialistic, and even revolutionary, in their scope the Government deemed them a menace and in 1878 once more passed laws against such unions, which had the effect of suppressing large numbers of bodies of workmen. In 1890 these restrictions were finally removed and nearly one-tenth of the German workers are now estimated to belong to some union. Some unions were started from economic, intellectual, or religious motives, but practically all have become socialistic.

There are now a great number of unions and subunions, but the great bulk of these are embraced in the following five groups: (1) The "Free" or Social Democratic Gewerkschaften; (2) the "Christian" Gewerkschaften; (3) the "German" or Hirsch-Duncker Gewerkvereine; (4) the Evangelical Workers' Unions; (5) the Catholic Workers' Unions.

THE FREE TRADES' UNION.

The Social Democratic Gewerkschaften, or, as it is usually known, the Free Trades' Union, is by far the most important and embraces some 1,100,000 of the total 1,500,000 union operatives in Germany. Of the 60,000 women in German unions some 48,000 belong to this organization. It is also the union that appeals most strongly to the textile workers, and of some 45,000 men and 20,000 women of the textile industry in unions, 41,000 men and 13,000 women are "Free" unionists. The largest group of workers belonging to the Free Union are the metal workers, then the masons, the wood workers, and the miners, the textile group ranking fifth.

This union was founded in 1867 and is the oldest of modern German trades unions, with the exception of the smaller unions of the tobacco workers, founded in 1865, and that of the typographers, founded in 1866. All three of these were started before the old law forbidding such organizations was abrogated. The headquarters of the Free Union is at Berlin. It is a very powerful body of workers and is carefully organized. Each class of workers is grouped by themselves, according to sections, and these again subdivided. For instance, all textile workers around Augsburg are entitled to join the textile branch of this union, but are subdivided into the carders' union,

the spinners' union, the weavers' union, the hosiery workers' unio etc., and the head of the general union at each center reports to head quarters at Berlin.

The objects of this union are educational, economic, and social istic. The educational part is devoted to the education of the worke along technical lines, supplementing the primary school educatio by lectures, conferences, etc., and arranging apprenticeships. Th economic part looks toward the raising of wages and the fixing o uniform wage schedules among all workers on the same line o work; giving relief in case of strikes and lockouts, sickness, etc. placing workers; organization of cooperative societies; constructio of good dwellings for workers, etc. The socialistic part deals wit the general amelioration of the condition of the workers, and i largely political. The annual assessment is from 8 to 16 marks, o say $3\frac{1}{2}$ to 7 cents a week, and these assessments, with other source of income, such as investments, interest, etc., bring in over $5,000,00 a year. The greater part of this sum is expended in sustainin strikes, agitating their propaganda by trade papers and other means assisting the sick and invalid, relief to operatives out of work funeral expenses, etc. The reserve fund is now about $4,000.00 The Social Democratic Gewerkschaften is supposed to be nonpolitica but they usually work with the Social Democratic party, though the are not necessarily supporters of any one party, but are free to wor with any party from which they can gain anything in furtheranc of their aims. The Social Democrats are avowedly atheistic, an the Social Democratic Gewerkschaften is largely so.

THE CHRISTIAN AND GERMAN UNIONS.

This atheistic tendency of the Social Democratic Gewerkschafte is one of the main causes that led to the formation of the Christia Gewerkschaften. The center of this union is at Cologne, and the number some 225,000 members, of whom about 32,000 are textil workers. Their objects are not materially different from those o the Social Democratic Union, except that they emphasize their belie in religion, and their main objects are the amelioration of the con dition of the working classes by cooperation among themselves, se curing an impartial administration of the laws, and improving an extending them.

The entrance fee of the Christian Union is 50 pfennigs (11.9 cents) but their yearly dues are higher than those of any other Germa union. These dues are varied according to the average wages re ceived in the various trades, but run from about 15 to 30 mark ($3.57 to $7.14) a year. Their yearly receipts are about $600,000, an they have a reserve fund of about $300,000. Most of the railroa and post-office employees belong to this union. In spite of thei religious prejudices against the Free Union they work with it fo the attainment of political ends.

Another union that exercises a strong influence is that called th German or Hirsch-Duncker Gewerksvereine, the latter name coming from its founder, Doctor Hirsch. Their objects are especially th securing of higher remuneration for work performed. They als agitate for the modification of labor laws in favor of the working classes, the betterment of conditions of work; they give aid in cas

of sickness or of stoppage of work, form cooperative societies, instruct workers and give them free counsel, and interfere in cases of difficulties between workers and employers to settle the disputes and arrange wage schedules, etc. They are organized into different trades and these subdivided. Their total membership is about 115,000; only some 6,000 textile workers belong to this union. The object of this union was at first purely economic, but it is now more socialistic. The yearly dues are 10 marks ($2.38). Their reserve fund is about $800,000.

EVANGELICAL AND CATHOLIC WORKERS' UNIONS.

The Evangelical Workers' Unions, formed about 1880, are divided into five main branches, which lie in Westphalia, Rhine, Saxony, Silesia, and Baden. Their object is to elevate the worker morally and intellectually, but their lines of work are not materially different from the three socialistic unions noted. They started as anti-socialistic, but most of their 150,000 members lean strongly toward socialism and are active politically. Their main strength lies among those engaged in commerce, such as clerks, bookkeepers, agents, employees in hotels and restaurants, etc., and very little among factory workers. They run a paper to exploit their views, possess libraries, savings funds, relief funds, bureaus for consultation and for placing workers, etc.

The Catholic Workers' Unions were started about 1885, and there are three main unions, those of the south, the east, and the west. Their objects are similar to that of the preceding unions, and they strive to raise the moral and intellectual level of their members within Catholic lines by means of religious and economic conferences. They issue a weekly paper, distribute tracts, and are active politically in furtherance of their aims. They work usually in conjunction with the Christian Workers' Union.

ORGANIZATIONS OF EMPLOYERS.

The rapid increase of workers' unions and their increasing insistence on shorter hours and higher wages has within the last few years led to similar organizations being formed among the employers for mutual protection.

There have been organizations among German manufacturers and employers in general for a long time, but such organizations were mainly local or for commercial purposes, for fixing or changing tariffs, etc. In 1876 there was formed in Berlin a central union of the German industries, the object of which was to develop and extend German trade. In 1904 the strike that broke out among the vigogne spinning mills at Crimmitzschau, in Saxony, fixed the attention of manufacturers on the necessity of having a stronger organization to combat unjust demands of workers, and, at the suggestion of the Saxon manufacturers, the committee of the central union of German industries called a meeting of German employers, which decided to create a central association of the united employers of Germany. Eleven members were appointed to draw up plans and act as an executive committee in establishing the new association. They immediately wired to all manufacturers and in forty-eight hours had collected some $75,000, and this was later added to largely.

This Central Association of the United Employers of Germany is now strongly organized and in its scheme of defense it embraces all the industrial unions of Germany. It was comparatively easy to organize the German manufacturers for the reason that the insurance laws of the Government had already forced all those in a certain trade in a certain section to work together on boards to administer insurance funds, examine injured and sick operatives, and to see that each factory had proper safety appliances, etc. They were, therefore, accustomed to working together and when menaced by this new danger they organized quickly on the new lines suggested.

This central union is composed of representatives from all the various German employers' unions, and they have subcommittees in each large industrial center representing all the employers' unions in that section. It is a principle among all these associations to try to avoid strikes and lockouts by all means possible, and to this purpose to have conferences with their workers, but to refuse absolutely to listen to representatives of outside organizations of workers.

OBJECTS AND RESTRICTIONS.

The special object of this central union of the employers' associations is announced to be as follows: To protect employers against unjustifiable demands of workers' unions; to protect those who desire work; to extend and develop the bureau for supplying employers with operatives; to execute decisions relative to strikes; to take charge of the legal protection of its members in all cases in which fundamental principles are at stake.

The central union endeavors to gain the adhesion of all manufacturers. It has a bureau for supplying information to members concerning movements of workers and their qualifications, and in regard to the causes and progress of strikes and the means to combat them, etc. Manufacturers may be refused the right of joining this union if their factories are isolated and at a distance from industrial centers, or for other reasons considered just by the majority of the executive committee, and members may be dropped who refuse to conform to the rules or the decisions of the executive committee or who by their acts endanger the interests of the association.

There is a general meeting once a year and funds are supplied according to a fixed assessment. Every member is supposed to work in the common interest by refusing to pay excessive wages, refusing demands for a reduction of the hours of work at his factory alone, refusing to employ workers who have quitted another employer in a manner unjustifiable or illegal, refusing systematically all interference by workers in the management of the factory and especially in regard to the employment and discharge of workers, and to conform fully to lockout decisions of the committee.

One of the most recent conflicts between the employees and the employers' associations resulted in the victory of the former. This was in regard to the amendments to the working law which were passed in December, 1907, and where the workers' unions, against the strong protest of the manufacturers, had the law modified so that after January 1, 1910, women can not work over ten hours a day, instead of eleven, thus reducing the maximum weekly factory hours to sixty, the substituting of twelve for thirteen as the legal hours per day in cases of temporary overtime permitted in certain cases, and other provisions along the same line.

TEXTILES FROM COTTON WASTE.

SKILLFUL METHODS OF UTILIZATION BY MANUFACTURERS—IMPROVED MACHINERY REQUIRED BY THE MILLS.

In Germany the manufacture of cotton waste into a great variety of finished products is quite an industry. Not only do the mills manufacture the waste from German cotton mills, but they also import cotton waste from all sections of the globe and, in many cases, ship the manufactured article back to the country from which the waste was bought. The cotton waste imported is listed as cotton linters, or as waste from cotton mills. The following table shows the import of cotton linters into Germany for the year 1907:

Country.	Pounds.	Country.	Pounds.
United States	38,069,912	Great Britain	1,128,228
British India	14,450,306	All other countries	2,249,402
China	2,680,284		
Dutch India	888,653	Total	60,381,225
Egypt	914,440		

Of the linters reexported, 6,158,417 pounds, the bulk goes to waste mills in northern Austria and the remainder to other neighboring countries.

The waste from cotton mills—sweeps, flyings, strips, etc.—imported into Germany for 1907, and the cotton-mill waste exported to other countries during the same period, is shown by the following table:

Country.	Imported.	Exported.	Country.	Imported.	Exported.
	Pounds.	*Pounds.*		*Pounds.*	*Pounds.*
United States	3,409,373	6,083,701	Japan	721,590	
Austria	16,179,564	14,540,449	Netherlands	10,946,607	15,718,928
Belgium	4,063,294	4,843,510	Switzerland	4,547,513	1,494,092
British India	1,025,742		All other countries	2,497,347	3,989,922
France	13,530,136	5,132,014			
Great Britain	13,906,358	912,456	Total	72,379,360	52,994,098
Italy	1,551,836	279,026			

It will be noticed that several countries both ship waste to and import waste from Germany. France and Austria, for instance, ship waste to Germany from various places, while Bohemian waste mills import waste from the German mills near at hand, and Alsace-Lorraine ships some waste over the French border. Germany buys all kinds of cotton waste from the United States, but especially soft waste, such as sweepings, flyings, and strips. Some of this goes into the manufacture of coarse towels, scrubbing cloths, dish rags, blankets, etc., which is then exported back to the United States or to the Philippines.

COTTON-WASTE CLOTH—VIGOGNE YARN.

Ten samples of this class of goods, which are made from America waste manufactured in Germany and then sold in the United State are transmitted with this report. In some of these articles bot warp and filling are made from cotton waste, while in others th warp will be jute, coarse linen, or other strong material and the fillin cotton waste. The yarns employed are usually between number .7 and number 6, while in some of the finer grades the waste yarns use run up to 8s or 10s or even higher where mixed with cotton. Th cotton waste shipped by Germany to the United States is mainly har waste for use in machine wiping, etc.

"Vigogne" yarn might also be considered in connection with co ton-waste spinning. This also is an important industry, and there ar over 600,000 spindles making vigogne yarn in Saxony. The re vigogne yarn consists of wool mixed with cotton and the proportio varies from 20 per cent wool and 80 per cent cotton to 2 per cer wool and 98 per cent cotton, and is used in cheap hosiery, in imitatio wool cloths, etc. In place of the wool, very often wool waste is use either in whole or in part. The less wool used the greater the profi where it resembles wool when finished. A large portion of this s called vigogne yarn now made in Saxony is not really vigogne, b is imitation yarn and in this case cotton waste is substituted for th wool and this is manufactured on wool cards and worked so as to loo like the genuine material, unless inspected at short range. The pr portion of cotton, of cotton waste, and of wool (where this is used varies according to the grade of material desired and is kept a clo secret by the respective manufacturers. It is, however, simply question of using the cheapest mixing that will obtain the particul result desired.

In the ordinary waste spinning where not over No. 6s is spun the is ordinarily used the two-card system, while for higher numbers, an always for vigogne, the three-card system has to be employed. Wit this exception the manufacture of vigogne or imitation yarn do not materially differ from the ordinary waste processes.

METHODS OF MANUFACTURE.

In the following notes a few brief details in regard to the manu facture of waste as carried on in German waste mills, cost and produ tion of the machines ordinarily used, and the wages paid operativ are given.

There are two main kinds of cotton waste: (1) Hard waste, or was in which there is some twist, is made on the spinning and subsequer machines, and consists of cop bottoms, reel waste, twister waste, etc hard waste has to be run through some machine to tear it up and tak out the twist in this way before it can be reworked; it is grade according to cleanness, whether white or colored, and according t the machine on which it is made; (2) soft waste, which includes a waste of the machines up to the spinning frame, such as motes, car fly, flat and cylinder strips, clearer waste, clean sweepings, oily wast etc.

There are two main systems of machinery generally used in th manufacture of cotton waste—the condenser and the coiler. The fir

resembles the wool system and the latter is more similar to the cotton system of manufacture. The condenser is best for soft yarn and gives a soft and full yarn that can be used for warp and filling for blankets, flannelettes, cleaning cloths, quilts, etc. The coiler is best for waste yarns that are intended to be harder twisted and to be used for filling for towels, cloth to be printed or dyed, for twine, rope, etc. The condenser system is the one used in the majority of the German waste mills. Here, as elsewhere, some regular cotton mills manufacture their waste into coarse yarns, but, except in the case of very large mills, this is not usually to be advised, for waste manufacturing is a separate branch of the industry and to get the best results it should be in a mill by itself.

PURCHASE OF COTTON WASTE—MACHINERY EMPLOYED.

The German waste working mills buy cotton waste by sample from German waste dealers, who in turn buy from the German cotton mills or from waste dealers in other countries. The terms of commission and discount seem to vary according to the country from which brought, and also according to the individual dealer, there being no uniformly observed rules. Dealers in French waste usually give 2 per cent discount, thirty days. From England the terms are the same for cotton waste as for cotton yarn and are according to the Manchester terms of sale. Dealers in American waste stated that their usual commission was three-fourths to 1 per cent, sometimes up to 1½ per cent, and that drafts are made, with bill of lading attached, for three months, nineteen days' sight.

In Germany the waste from the mills does not usually have to be transported far and is shipped in sacks weighing some 25 kilos (1 kilo=2.2 pounds). From other countries the waste comes in pressed bales weighing 200 to 300 kilos. From the United States the waste bales are of the same size as cotton bales, about 500 pounds. Usually 5 or 7 per cent is deducted for covering.

In the usual cotton-waste mill in Germany using the condenser system the following machines are employed: (1) Opener (Baumwollöffner); (2) picker (Baumwoll-Schlagmaschine); (3) double automatic waste cards (Automatischer Zweipeigneur-Krempelsatz); (4) waste mules (Streichgarn-Selfactor).

In addition some have reels or other machines for putting the yarn up in special shapes. Instead of the mule some use a tubular cop machine, and others use a waste ring spinning frame for making yarn for specific purposes.

OPENER AND PICKER MACHINES.

In the type of opener ordinarily used, a drawing of which has been sent, the waste is first mixed by hand, very often white waste from a wadding mill being mixed with dirty sweepings to lighten up the color, or other mixing made as desired, according to the grade of yarn to be produced. This is then fed into the spout, and after being partially cleaned falls off the moving lattice at the other end, the cleaning being done by horizontal revolving blades, made very similar to the ordinary Crighton opener for cotton. One size of this opener is about 55 by 105 inches, weighs about 4,850 pounds, and sells for about $400; the other size is about 70 by 150 inches, weighs

8,800 pounds, and sells for about $500. There is a double opener which is about 70 by 315 inches, weighs some 17,000 pounds, and cost about $1,050, but is similar in its action to the others. In some o the openers the waste is pushed in through the spout by hand and in others it is spread by hand onto a movable lattice, which feeds it into the machine. The driving pulley is usually run at 1,00 revolutions per minute.

In a combined opener and picker, illustration of which is forwarded, the cotton as it comes from the opener is laid on a lattice which feeds it into the picker, where it is fanned and beaten. The machine is similar in its general action to the regular cotton-mill picker, but instead of a beater with blades a cylinder is here used covered with short projecting spikes. The cotton is not rolled into a lap, but is run up a moving lattice and allowed to fall to the floor whence it is then carried to the hopper of the automatic double card as described later. The picker is about 68 inches wide (for a working width of 40 inches) and 160 inches long, weighs about 6,80 pounds, and costs $650. The driving pulley is usually run at abou 1,000 revolutions per minute. It takes about 3 horsepower to operate, and has a production of 3,300 pounds per day of ten hours. The combined opener and picker in question has the same width as the single opener, is about 19 feet long, weighs about 14,500 pounds and costs $1,125 at Chemnitz. One workman is required per machine and gets 36 to 48 cents a day.

WASTE CARDS.

One of the largest Saxon machine firms and one that ships a good deal of machinery to the United States is at Chemnitz. One of its specialties is waste cards. These, as shown in illustrations forwarded are simply modifications of the woolen-card system. For making cotton-waste yarns up to No. 4s this firm recommends the double card. The action of the cards is clearly shown in the catalogue illustration and requires little explanation. The cotton from the breaker card is conveyed in an open lap to the roving card, where it is separated into slivers and wound up into numerous adjacent sections or cheeses on four lap sticks. The two cards work together, and one girl (usually at 48 cents a day) is the only help employed. The width is usually 6 inches, and the total weight of the two cards is 42,000 pounds. This machine makes 40 slivers on each lap, or 160 slivers total, and the production per ten hours is 550 to 660 pounds, or enough to supply some 600 mule spindles. The cost is $3,350 at Chemnitz; seapacking 5 per cent extra. The freight on machinery from Chemnitz to Hamburg is 2.5 marks per 100 kilos (59½ cents per 220 pounds), and from Hamburg to New York is $5 per metric ton. Insurance is 50 pfennig per 100 marks (12 cents per $23.80 hundredweight).

For making cotton-waste yarns between No. 4s and 8s the firm recommends a one-comber system. This set of cards is also 65 inches width, it weighs complete 36,000 pounds, and costs at Chemnitz $2,856. It makes 140 slivers total on the four laps and produces 350 to 40 pounds of Nos. 4s to 8s yarn in ten hours, or enough to supply 600 t 650 mule spindles.

For yarns Nos. 6s to 12s the three-card system becomes necessary and especially for vigogne yarn, which is very often made without wool, using only cotton and cotton waste. The three-card system

veighs complete 45,000 pounds and costs $3,570 at Chemnitz. The production on Nos. 6s to 12s is 275 to 330 pounds in ten hours, or nough to supply 700 mule spindles. There are 140 slivers to the four aps and the width is usually 65 inches, though any width, number of aps up to 6, or any number of slivers to the lap, can be made as lesired.

TANDEM THREE-CARD PROCESS—HOPPER FEEDER.

A tandem arrangement of a three-card set is made by a manufacturer at Verdau. These cards are 65 inches wide and make 120 slivers at a time. The cost at Verdau, packing not included, is $2,737. Running on No. 6s the production per day of ten hours is given as 296 pounds. Waste mills using this system at Verdau employ one girl at 48 cents a day to run the set.

To consume the production of such a card set there are necessary wo self-actors of 300 spindles, each with gage of 1.9 inches. The price of such a self-actor as made at Verdau is $857 at that place, and o attend such a self-actor two girls are employed at 48 cents each. For every 1,000 to 1,500 mule spindles a spinner is necessary at $1.19 a day.

The waste cards are not supplied with laps, but are connected direct to a hopper feeder. The ordinary hopper feeder does not feed evenly, being affected by the weight of material in the hopper and other causes, and to obtain an even yarn from the card it is necessary to have uniform feeding, so some intermediate weight-regulating apparatus must be used. This is especially necessary for the so-called automatic card sets; for the automatic supply of material from one card to another it is essential to have an exactly regular feeding of the first card. Formerly the card was fed by hand, and this method is still used in a good many mills with old machinery. The operative weighs a certain amount and spreads it by hand over a certain space on the feed apron. The weight-regulating device now used carries out just the handwork described. Formerly the evenness of the yarn varied according to the conscientiousness and ability of the operative, while the mechanical device works automatically and does the work more exactly and at less cost. This weighing device is made in different shapes and styles by different firms, but the method of all is similar.

In using weighing devices on this machine made at Chemnitz the raw material is drawn out of a hopper by the usual spiked lattice, but instead of falling onto the feed apron it drops into a weighing trough. The two bottom plates of this trough are hinged and are balanced so that they only open when a certain fixed weight has been supplied. As soon as the correct amount has been dropped into the weighing trough the spiked lattice is automatically stopped, the two bottom plates drop down, and the waste is shed out on the feed apron, where it is immediately spread out evenly by a swinging presser arrangement and feeds on into the card. As this moves forward the bottoms of the weighing trough close up, the spiked lattice starts delivery again, and the process is repeated as before. This apparatus can be adjusted so that the speed of the feed apron, the weight of the material to be put in the weighing trough, and the frequency of its

emptying, can be arranged according to the different materials to be worked. The attendant has only to keep the hopper supplied.

WASTE SPINNING ON MULES.

The waste mule differs from the regular mule used in cotton mills in that there are no drafting rolls. The laps, consisting of 24 or more separate slivers wound on a lap rod, are taken direct from the waste cards and laid on the back of the machine, whence they run under one self-weighted roller direct to the spindles. The speed of spindles is necessarily varied according to the strength and quality of the material supplied.

The production depends so much on the mixing and kinds of waste used that figures as to this have small value. The wages also vary at each mill. At a waste mill I visited at Zittau, in Saxony, I found that they used mostly sweepings, card fly, and similar material and mixed in some white waste from a wadding mill to bring up the color. The mules used were 500 spindles each, and on No. 6s waste yarn they were doffed about six times a day, getting 26½ to 33 pounds at a doff or 176 to 198 pounds a day. For every 500 spindles there were required one spinner, one piecer, and one creeler. The spinner was paid on No. 6s 86 cents per 200 pounds, the piecer received 70 per cent as much, and the creeler 50 per cent as much. The spinner therefore made about 78 cents a day, the piecer 54 cents, and the creeler 40 cents. This was on low-grade waste. In most of the mills I found that there were used a piecer and creeler to every 500 spindles, but that the spinner looked after three to four mules, usually about 1,500 spindles. Few of the mules for waste spinning are made over 500 spindles, and 330 spindles seem to be a common size. In many places the operatives are paid by the day or by the hour, and this is probably due to the impossibility of paying by production where many different kinds of mixings are used. Most of the vigogne (the imitation yarn vigogne) mills pay by the hour and the spinner gets 95 cents to $1.19 a day, and the others in proportion. At one mill at Crimmitschau, where there are many vigogne yarn mills, one manufacturer gave me his prices as being 30 pfennigs an hour for the spinner (71 cents a day), while the girls who acted as piecer and creeler got only 20 and 15 pfennigs an hour (48 and 36 cents a day, respectively), but this is a little lower than usual.

Prices paid for reeling vary, but for No. 6s cotton-waste yarn the usual price is one pfennig per English pound. [Pictures of all the machines mentioned in the foregoing part of the report and samples of various textile fabrics made from cotton waste and linters are filed for inspection by the textile trade at Bureau of Manufactures.]

A NEW RING SPINNING FRAME FOR COTTON WASTE.

Cotton waste is usually spun on the mule because the material consists of short and uneven length fibers and could not be spun on the ring frame without excessive twist. To spin on the mules, however, is more expensive than to spin on the ring frame, and there have been many efforts made to adapt the ring frame to fulfill the functions of a mule and yet retain its cheapness of operation. One such

laptation of the ring frame has been patented by a firm at Gebeiler, in Alsace, and is being introduced into the cotton-waste mills. ı one mill where I saw this machine in operation the manufacturer as enthusiastic as to its merits. The special advantage of this achine is that it makes a cleaner and more even yarn than the ·dinary ring frame and permits of a higher draft. It can not take ıe place of the mule for very soft spun yarns, but for many purɔses, especially for making warp yarns to be used in scouring cloths, .rpets, etc., the yarn from this machine is as good as that obtained ·om the mule, and at much less cost.

This machine is made in two styles. The first is shown in fig. 1, ith a detail view of the rolls and the roller stand in fig. 2. This

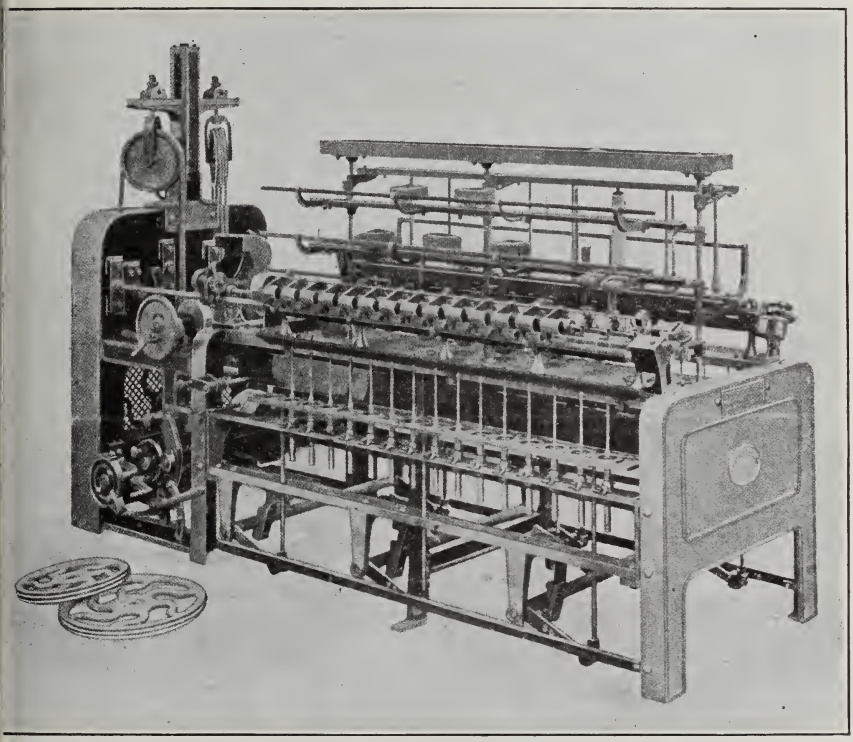


FIG. 1.—Ring spinning frame with drawing.

iffers mainly from the ordinary frame in the introduction of a nadelwalze" or needle roller between the middle and front roller nd this parallels and cleans the yarn as it is being drafted. The econd style is shown in fig. 3 where, in addition to the last-named ystem, patented by Perrin, there is added an intermittent second .raft arrangement that is patented by Meyer.

The maker calls this a "Ringspinnmaschine mit Streckwerk," that s, a "Ring spinning frame with drawing." He claims that all mixures of textiles, such as cotton, wool, or silk waste, noils or short ibers of ramie or jute, etc., can be spun on this machine and that the esulting yarn is equal to any made on the mule. With Louisiana otton the arrangement of the rolls permits a draft up to 16s for

single roving. Nos. 25s to 28s yarn can be spun direct from No. 1.8 hank rove, and in consequence of such arrangement one process of fly frames can be omitted and the production of the cards be much increased. The yarns are much cleaner than if made on a regular spinning frame, owing to the cleaning action of the needle roller. This roller does not lap up and needs no cleaning.

MECHANISM OF ROLLERS.

On this machine, with the arrangement shown in fig. 3, the first draft is made between the fluted roll A with its pressing roll A' and the stretching roll 3, with its pressing roll 3, and between these two is the needle roller H. A second draft operating similarly to the carriage draft on a mule is produced in the following way: Between the stretching roller 3 and the spindle 7 there is a revolving through-going roller provided with two cam-like projections 4, which serve to move up and down on each revolution of the roller the press-

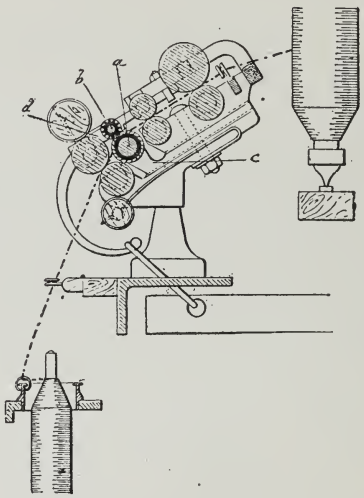


FIG. 2.—Rolls and roller stand of ring frame.

ing roll 2. When this roll is up the twist is specially transferred to the thin place in the yarn shown by the figure 9. When, however, the pressing roll is on the roller 1 then the latter develops a draft between it and the stretching roller 3. This draft affects especially the thicker places shown by the figure 8, where there is less twist than at the places 9, so these thicker places are twisted together and the yarn becomes uniform. As the two drafts are multiplied by each other a considerably higher total draft is thereby obtained than on any other spinning frame.

The maker claims for this machine the following advantages over the mule: (1) The manufacture of strong cops up to 8.5 inches length, and about 1.50 inches diameter; (2) large draft whereby the roving can be made heavier and a larger production thereby obtained on the card; (3) uniformly regular draft as the fibers, whether long or short, are guided and kept together by the wires of the small needle roller shown as *a* in fig. 3; (4) regulation of the drafting accord-

ng to the length of the fibers; (5) the production of one of these ing frames of 200 spindles is equal to that of a mule with 330 pindles and occupies only one-fourth the floor space; (6) the labor ost is much cheaper, as to attend a ring frame of 280 spindles there s only required two girls; (7) the consumption of power by the frame s nearly 30 per cent less than that of the mule.

As used in the waste mills this frame is creeled with cheeses or ections of single ends taken direct from the waste card. One such heese is shown at *M* in fig. 3.

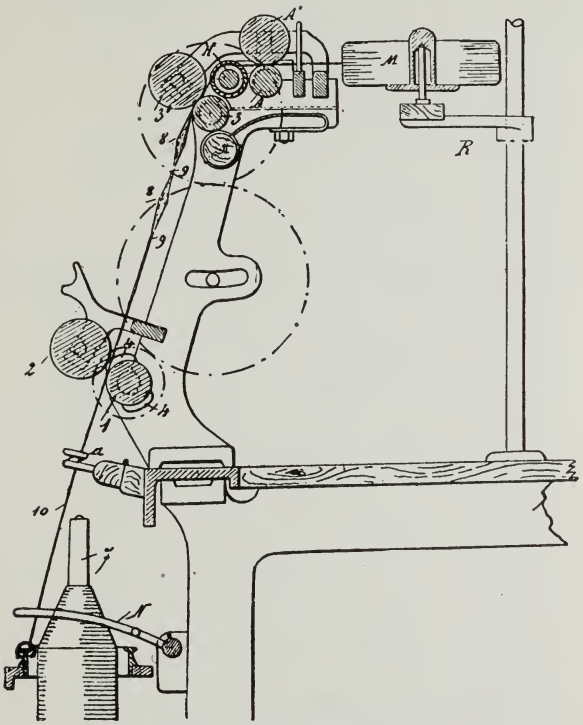


FIG. 3.—Intermittent second draft arrangement of ring frame.

The present price of this 280-spindle frame, with 100 mm. (3.94 inches) gage, is $1,904, with extra 6 per cent for sea packing.

TUBULAR COP MACHINE.

The tubular cop machine, called in Germany a "Schlauchkops-Spinnmaschine," is a machine that is used for making coarse yarns from cotton waste, cotton, wool, hair, etc., and obviates the necessity of using the expensive self-actor.

Like the ring spinning frame for cotton waste, previously described, this machine spins direct from the waste card without intermediate process, but the product of this machine is cops for immediate use in shuttles in weaving carpets, scouring cloths, etc., while the product of the other was warp yarns.

Figs. 4, 5, 6, and 7 are taken from the catalogue of a Chemnitz manufacturer, the first showing the complete machine. The operation is as follows: The single roving cheeses from the waste cards

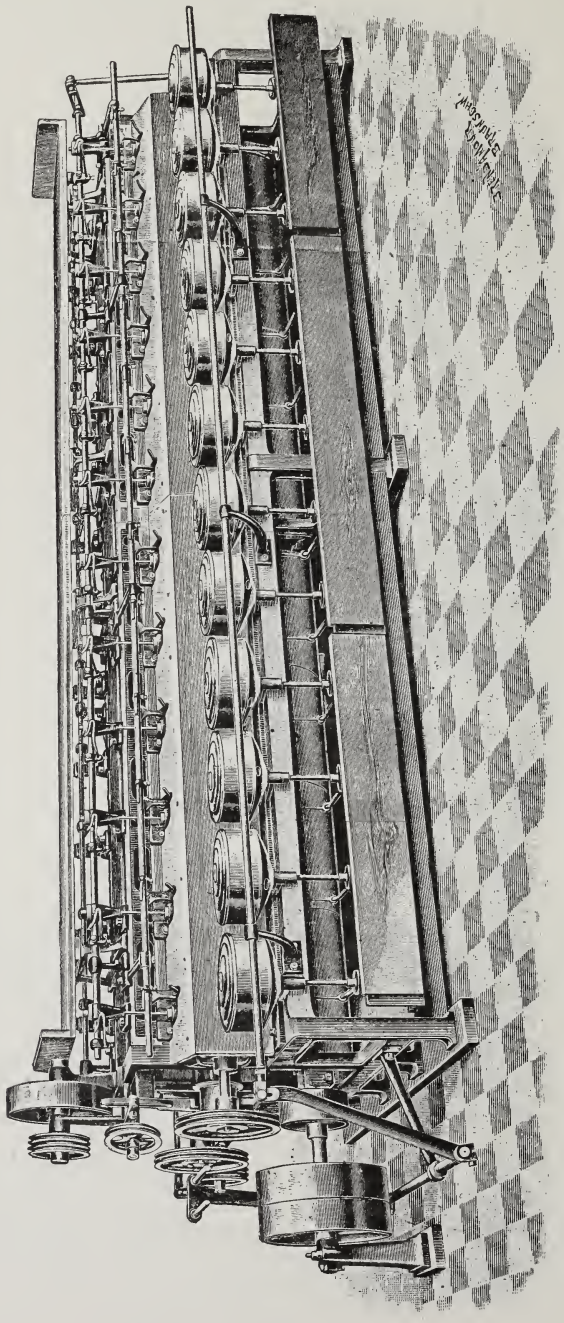


FIG. 4.—Tubular cop machine.

are laid in the round metal cans shown as *K* in fig. 5. The lids of these cans can be lifted, and are made fast to the can simply by pressing down. The inner end of the roving is drawn from the cheese

that has been placed in the can, through the hole in the middle of the can lid, and is led upward over a roller, through a swinging thread guide *f*, to the funnel in which the yarn is to wind itself in cone shape. The tin cans *K* are fastened on vertical spindles, which are put into rapid revolution by belt from the drum under the machine. In this way the roving that is being drawn out of the tin cans gets the necessary twist. The spindles are four cornered and are driven by means of small bevel gears on a horizontal side shaft. As the cop grows it is steadily lifted higher out of the funnel which forms the cop shape, and when the cop has reached full size the spindle is automatically stopped. Each can and the spindle can be placed in or

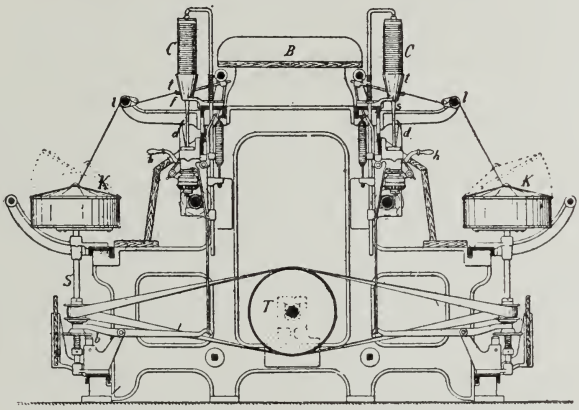


FIG. 5.

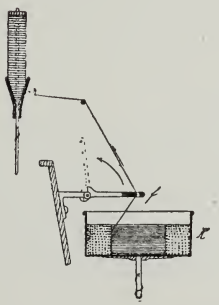


FIG. 6.

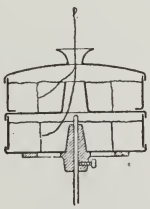


FIG. 7.

Details of operations of tubular cop machine.

out of position by a disengaging apparatus separately of the others. The brake *d* holds the spindle when disengaging, so that the thread does not get more twist owing to the can continuing to run. By pressing on the lever *h* each can is placed in position with the spindle, and by lifting the lever the cans come immediately to a stop.

VARIATIONS IN TYPES—COST OF VERDAU MACHINE.

The roving cans are sometimes used without lids, as shown in figure 6, where the roving cheeses work separately. In this case the yarn is drawn through a movable thread guide. The tubular cop machine can also be used for twisting, when spinning, by means of a double can, as shown in fig. 7. The cans themselves can be made in many different shapes, and the firm in Chemnitz has patented a number of such makes for different purposes. The swinging of the thread guide

can be arranged to give any desired crossing of the yarn; the yarn can be spun with right or left hand twist, and by choosing funnels that have been slitted in the proper manner the cop can be wound either right or left handed. Finished cops are laid on the top of the machine. All movable parts of the machine are sheltered from dirt and from contact with the working girls by removable covers. The machine is usually made with cans on both sides, but is sometimes made one sided, so as to be placed against the wall. The usual spindle gage is 333 millimeters (about $13\frac{1}{8}$ inches), so that large cheeses of 300 millimeters (11.8 inches) diameter can be used in the cans and the loss of time occasioned by frequent replenishing with smaller cheeses avoided. The width of such a machine as made by the Chemnitz manufacturer is 1,800 millimeters (about 71 inches), and the length is equal to the number of spindles on a side. For yarns to be spun finer than No. 1 English—that is to say, for Nos. 3 or 4—cans of about 200 millimeters (7.8 inches) diameter and narrower spindle gage are substituted. The power required is about one horsepower per 25 spindles. On No. 1 yarn the production per spindle is about 12 pounds per day of eleven hours, and one girl runs 12 spindles.

A firm at Verdau, Saxony, gives the cost of a 60-spindle tubular cop machine at $952, to which has to be added 10 per cent for sea-packing charges. Such a machine is stated by this firm to give a production of 770 pounds of yarn per ten-hour day, with 6 female operatives, and to be the correct number of spindles to handle the delivery from a double waste card making 4 laps of 80 threads each.

Tubular cops can be made on these machines up to 60 millimeters (2.36 inches) diameter and up to 300 millimeters (11.8 inches) in length. These tubular cops are firmly made and when placed in the shuttle require no spindle, as the cop entirely fills the shuttle, and the thread is drawn out from the inside.

THE COILER SYSTEM.

As has been shown in the foregoing, the condenser system of waste manufacture uses an opener, picker, automatic double or triple card set with hopper feed, and mule. The coiler system is not adopted as much as the condenser system in Germany, but the machines used are as follows: (1) Opener; (2) picker with lap-making apparatus; (3) breaker card with 1, 2, 3, or 4 cans; (4) doubler and lapper; (5) roving card; (6) mule.

In this system there is interposed between the two cards a doubler. This machine takes the slivers from some 40-card cans ranged on either side and rolls them up into a narrow compact lap. The breaker card can be made as desired to coil into 1, 2, 3, or 4 cans, and these are the ones that go to the doubler, which will take the production of 8 to 10 breaker cards. The lap as made on the doubler is usually one-half the width of the roving card, and two are placed together on a lap rod. Very often to secure still more uniform results four of these laps, forming two card laps, are placed behind the roving card. The laps as made on this card go to the mule as in the other system.

The coiler system has the advantage of the condenser system in that there is more doubling of slivers, and therefore the resulting yarn is evener in grade, and it also has the advantage that any card can be stopped for repairs or cleaning separately. It has the disadvantage, however, of introducing another machine, which adds to the cost of manufacture.

EMBROIDERIES AND LACES.

BARMEN DISTRICT.

DETAILS AND VALUE OF OUTPUT OF BRAIDED GOODS—VARIETY OF STYLES AND PATTERNS MANUFACTURED.

Cotton manufacturing, with its many ramifications and special branches, is probably the world's greatest industry. In Germany each special branch tends to concentrate in some particular section and around some particular town. Thus Chemnitz is known for hosiery, Plauen for embroidered laces, Gera for fine dress goods, Crimmitzschau for vigogne yarn, Augsburg for fine spinning, Mulhausen for fine weaving, Elberfeld for colored goods, Crefeld for velvets, etc. The specialty of Barmen, in western Germany, and one that has caused it to be a familiar household word around the world, is braided work, and particularly that branch of braided work known as "Barmen laces."

There are in and around this town some 80,000 braiding machines, with probably 3,000,000 braiding spindles. Of these machines it is estimated that between 8,000 and 10,000 are devoted to the specialty of Barmen lace.

EXPORTS OF SPECIALTIES TO THE UNITED STATES.

In regard to the total production there are no official figures, obtainable, but leading manufacturers estimate the export of lace from Barmen as being about 10,000,000 marks (mark=23.8 cents) a year, and that this is only one-third of the total production. The only trustworthy figures in regard to the exports are those of the American consulate showing the exports to the United States.

Considering only work made on braiding machines and ribbon looms and the additional exports of polished "iron" yarn (the latter because sent to the United States to be used in braided work), the exports of these specialties from Barmen for the last five years have been as follows:

Specialties.	1903.	1904.	1905.	1906.	1907.
Barmen lace (torchon)	$146,727	$159,912	$204,704	$237,072	$342,382
Laces, cotton, and other materials	154,367	143,728	212,772	202,300	244,391
Hat braids	167,552	225,124	207,941	240,975	175,654
Hatbands and ribbons	1,202,685	583,100	689,200	915,800	990,900
Galloons, trimmings, and edgings	190,995	158,437	155,152	280,126	361,863
Braids (featherstitch and Battenberg), etc.	423,068	362,807	333,747	347,694	320,727
Iron yarn	116,572	153,510	172,740	184,164	205,136
Total	2,401,966	1,786,618	1,976,256	2,408,131	2,641,053

It will be seen that though the shipments of some specialties have declined, that of Barmen laces has steadily increased from $146,727 in 1903 to $342,382 in 1907, and this in spite of the tariff and the fact that Barmen laces are being manufactured in the United States in increasing quantities. The wages paid in Barmen are lower than in the United States. The manufacturers here do not attempt to run on standard articles as much as is done in America, but keep a large force of designers who are alert to invent new designs and to catch every passing whim of the market. These designers are thoroughly trained in the excellent German technical schools, and are always hard at work to keep just a step ahead of their competitors.

ORIGIN AND GROWTH OF THE INDUSTRY.

"Barmen laces" are now made in many countries, notably Belgium, but they were originated at Barmen, and this place was the first to use both the hand and the machine in this work. The first machine to make this specialty in other countries seems to have been one patented at Manchester, England, in 1748, but the making of Barmen laces had been a well-established industry at Barmen long before this period. The industry was established in the United States by men from Barmen and is to a certain extent still carried on by them.

In ordinary weaving there are used two sets of threads, one the warp and the other the filling. In braiding there is used only one set of threads, and these are plaited together to form the design desired. In the making of braids these threads are plaited or braided together in many different ways, so that every thread plaits with every other thread, groups of threads combine with each other, braids join with other braids, or parts of braids plait with parts of other braids, the latter forming the laces.

Barmen lace is really a fancy braid, and is made on a machine that is simply an improved braiding machine. The system of all these braiding machines is that of the "Maypole," and the main principles may be fixed in the mind by a description of Maypole dances.

PRINCIPLES INVOLVED IN MAKING BARMEN LACE.

Suppose there are a number of dancers around a Maypole—say, 16—each holding an end of a ribbon of which the other end is fastened to the top of the pole. Suppose, first, that the 16 dancers are divided into two parties of 8 each, and that each party dances around the pole in an opposite direction, each group following the path of its leader and taking a serpentine course so that every dancer goes to the right and then to the left of alternate dancers of the other party going in the opposite direction. There will be formed at the top of the pole a "round" braid or cord.

Suppose, second, the same conditions as before, but that instead of continuously circling the pole in the same direction the leader of each party, on the completion of a circuit around the pole, passes completely around the last member of the opposite party and goes back to the starting point. In doing so he follows the serpentine course traced by the opposite party—that is, he follows the reverse semicir-

cles to his own course in advancing. There will be formed at the top of the pole a "flat" braid.

Suppose, third, that the 16 dancers do not circle the pole completely, but are divided into four parties of 4 each, and that each four dancers interweave among themselves on their own special arc of the circle. Where their course laps that of the adjoining group each dancer passes around one dancer of the adjoining group, but otherwise they interweave only among themselves. There will be formed at the top of the Maypole a "stripe" braid.

Suppose, fourth, that the dancers are divided into four groups of 4, each interweaving on their own particular arc of the circle, and that in this case their course does not overlap that of any of their neighbors. They interweave among themselves, but at regular or irregular intervals, at the direction of the leader, one dancer changes places with one dancer from a neighboring group, weaves a figure with them, and then returns to his own group. There will be formed at the top of the pole a "Barmen lace" braid.

In the machine the place of the top of the Maypole is taken by the suspended eye of a "braid former," which collects all the threads into one hole, the places of the dancers are taken by bobbins of thread held by "bobbin carriers," and for the tracks of the dancers are substituted grooves cut in a steel plate.

OPERATION AND UTILITY OF THE MACHINES.

Fig. 8 shows the types of grooves used for making each of the four styles of braids mentioned. Fig. 8A shows that the two sets of carriers going in opposite directions cross at regular intervals in their serpentine courses, but that each set has its own track, never gets on that of the other, and never changes the direction of its circling. Four bobbins is the least number that can be used to make this type of braid. Four bobbins make a square braid, six a hexagonal, eight an octagonal, etc., the larger the number the more nearly approaching a complete circle being the resulting cord.

Besides cords, this machine is also used for making steam and water packings, and in this case there is usually an extra "core" of rubber or some other material run up through the middle of the machine around which the threads interlace. In cases where it is desired to use a core of asbestos or other loose material the material is placed in a funnel over the top of the braid former and part of the carriers placed so as to run upside down. In covering whips, telephone wires, etc., the machine is frequently turned on its side so that the core is fed through horizontally. For covering heavy cables there are often three vertical machines arranged one above the other. There is an infinite number of combinations and arrangements of machines of this type for making cords, tubular braids, etc., or for covering work.

VARIOUS STYLES OF FLAT BRAID MANUFACTURED.

In fig. 8B it will be seen that each set of carriers makes a circle around the circumference of the machine and then reverses and returns to its starting point on the grooves previously used by the other set. As in the first case, the carriers do not interweave among themselves, but only with the carriers of the opposite set. Braid of this kind—flat braid—can be made with as few as three carriers. It is therefore the simplest braid that can be made, as two threads can not be braided, but only twisted around each other. To make this braid it is necessary to have an odd number of spools—3, 5, 7, 9, etc.—and flat braid thus made is usually called "soutache" braid. A soutache

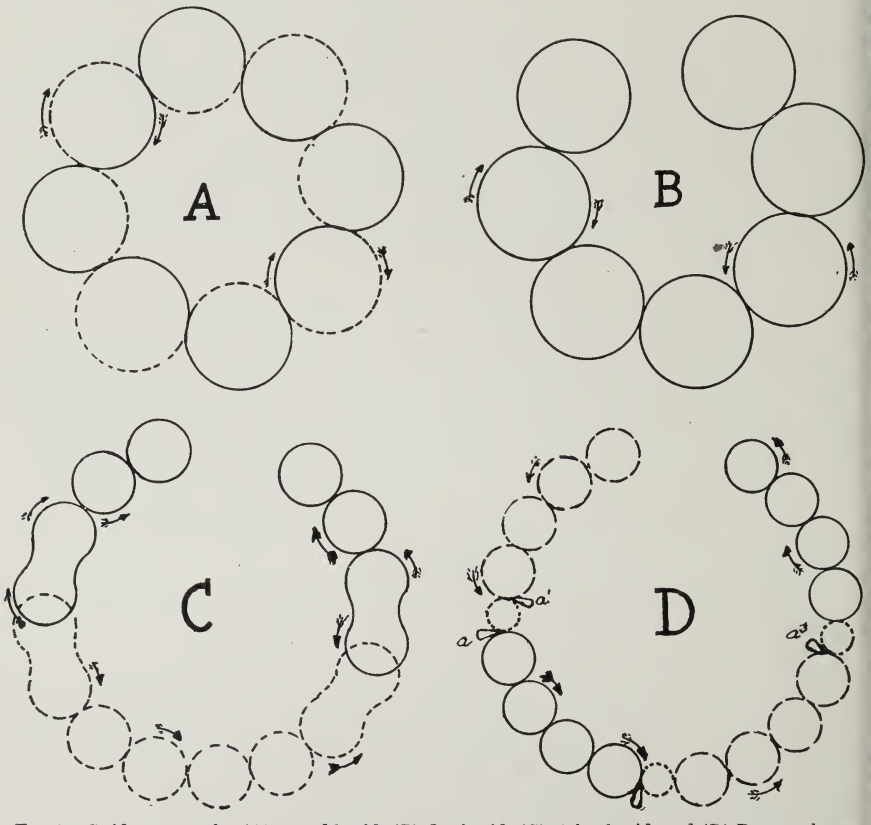


FIG. 8.—Guide grooves for (A) round braid, (B) flat braid, (C) stripe braid, and (D) Barmen lace.

braid made with three threads is called a "plain" flat braid, and every thread passes under and over every other thread.

If a soutache braid is made with five spools—in which case each thread passes alternately under and over two threads—it is called a "basket" or "diamond" braid; if made with seven threads—each thread passing alternately over and under three threads—it is called a "Hercules" braid. Flat braids are used for many purposes, but especially for passementerie and dress edgings or ornamentation.

By varying the tension exerted on different threads there can be made wave braids, rickracks, etc., and these can be ornamented with loops, in a manner to be described later, or in other ways, so that

here are many special articles made of this type of work.[a] A combination of the round and the flat braid types makes the "cord-edge braid," which consists of a cord running down the middle of a flat braid. This is much used for covering the edges of jackets, etc., the two flat parts being folded back on the upper and lower sides of the cloth and leaving the cord covering the edge.

STRIPE BRAIDS AND BARMEN LACES.

Fig. 8C shows the guide grooves for making stripe braid. These are so arranged that each set travels exclusively on its own track on its own particular arc of the circumference of the machine, but each track overlaps that of its neighbor, so that the threads carried by the bobbins of one set twist at regular intervals around the threads carried by the bobbins of the neighboring set. The bobbins of each set weave a braid among themselves, the overlapping being arranged only for the purpose of joining these separate braids together. This is the reason that the combined braids are known as a stripe braid. The separate stripes may be of different colors or materials. It is not necessary that each set shall have the same number of bobbins, and, in fact, it is usually otherwise. For instance, one of the regular staple articles in this line is made with 66 bobbins, arranged on a machine with five tracks, carrying 12, 9, 24, 9, and 12 threads each, respectively. A simpler design is made with 40 bobbins arranged on three courses of 12, 16, and 12 bobbins, respectively. Each top plate has to be grooved with reference to the number and combination of spools it is desired to employ.

Fig. 8D shows the guide grooves used for making Barmen lace. Each group interweaves on its own course, and, as these do not overlap, the bobbins, if the switches at a, a', etc., are closed, do not mingle with any outside bobbins. The switches are made of small tongues of steel plate, and some are pivoted loosely so as to open to any carrier coming in the right direction, say one returning to its own group, while others are controlled so as to permit passage only when moved by special mechanism, and this opening may be at regular or irregular intervals, as desired.

CONSTRUCTION AND OPERATION OF THE MACHINES.

Fig. 9 shows the regular style of machines now used at Barmen for making Barmen lace. This particular machine is described as a "2 fadige, 24 litzen Spitzenmaschine mit Jacquardmaschinen"—that is, a 2-thread, 24-track lace machine with Jacquard attachment. There are 24 tracks, and 2 bobbins are operated on each track, so the resulting lace has 48 threads. A view of the top plate, showing the guide grooves used on this machine, is shown in fig. 10. Using these two illustrations, I will explain the main points of construction and operation of such machines.

---

[a] By letting some of the carriers run empty, open-work braids can be produced. This method is extensively used for making hat forms out of glazed or "iron" yarn, and in 1907 Barmen, as shown in table, shipped to the United States $175,654 of this one specialty.

The body of such machines consists of two steel plates, which are circular in shape, except where extended for the purpose of attaching the take-off mechanism and the Jacquard attachment. The plates are

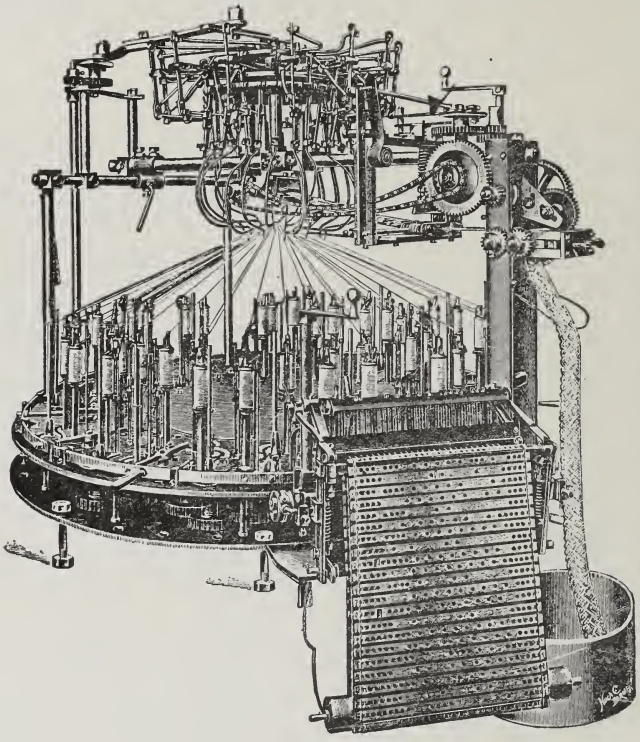


FIG. 9.—Regular style of machine used in making Barmen lace.

held one above the other at a distance of 4 inches by means of stay bolts. Between the two plates are arranged the gearing for driving the bobbin carriers. The bottom or bed plate holds the stud bolts, on

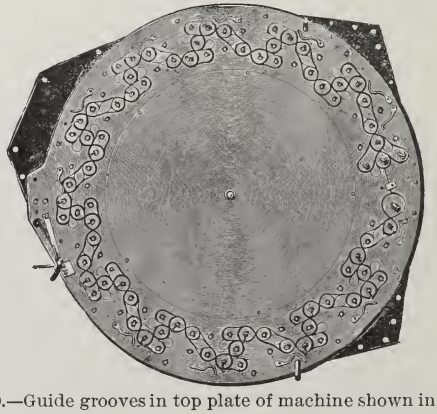


FIG. 10.—Guide grooves in top plate of machine shown in fig. 9.

which revolve the "horn gears." The top plate has guide grooves cut in it according to the type of braid to be made, and these grooves guide the course of the bobbin carriers.

THE BOBBIN CARRIERS AND THEIR ATTACHMENTS.

The "bobbin carriers" are really the most important part of the machine, and will next be described with their attachments. The thread is wound on bobbins or spools, which may be of different sizes or shapes, as desired. The usual type is a double-headed bobbin with a 4-inch traverse and a diameter, when full, of $1\frac{3}{8}$ inches. Two threads are usually wound on each bobbin together, but there may be one only or there may be three, four, or more, according to the kind of lace to be made. The bobbin carriers may be arranged to carry the spools either horizontally or vertically. The horizontal arrangement permits of the thread being drawn off more evenly with less liability of kinking, but takes up more room, so is not used except for special purposes. The bobbins have round bores and are slid on the spindle of the bobbin carriers so as to permit of turning easily. The ordinary spindle is made in the shape of a hollow square with rounded edges, being of pressed steel bent and brazed together.

A vertical bobbin holder of the ordinary type used at Barmen is shown in fig. 11. The small foot plates *b* and *b'* of this bobbin carrier are separated from each other a distance equal to the thickness of the top plate by the small vertical bar *c*. This bar is a short straight piece with rounded ends and slides in the guide grooves. The foot plates *b* and *b'*, being above and below the top plate of the machine, keep the bobbin carrier vertical.

The pin *a* at the bottom of the bobbin carrier rests in a notch of the horn gear below and the revolution of the horn gear therefore moves the bobbin holder. These "horn gears" are made with double flanges. The lower flange has cut in its circumference ordinary spur teeth and is revolved by means of other gears which transmit to it power from the driving belt. The upper flange is cut with notches and horns, and the number of these notches varies according to the class of machine and the position of the gear on the machine. These upper flanges work close together, so that one is beveled on the lower edge and one on the upper edge.

THE TENSION AND AUTOMATIC STOPPING DEVICES.

Every bobbin carrier has a device for regulating the tension of the thread being drawn off and also an arrangement for automatically stopping the machine when a thread breaks or runs out. The stop-motion arrangement consists of a small piece that slides up and down on the standard. This is shown as *d* in fig. 11. When in operation the thread passing through the eye in the top of the piece *d* holds it up, but when the thread breaks or runs out this piece falls and a projection at its bottom strikes against a lever on the top plate and this, through the usual connections, stops the machine. For large machines there are usually four or six of these levers arranged at various points on the top plate, so that the machine is quickly stopped when the bobbin carrier with a fallen stop-motion weight reaches this point.

The tension device consists of a weight hung on the thread, and this weight may be hung inside the hollow spindle of the carrier or may slide up and down on the top part of the carrier outside. Fig. 11 illustrates the first and fig. 12 the latter. The weight is usually hung inside, as the centrifugal force of a rapidly revolving carrier

tends to prevent an outside carrier dropping quickly enough to prevent kinking when the thread slackens. The weight is thus also more protected from dirt, but this arrangement makes the threading somewhat more troublesome.

Fig. 11 shows a carrier without bobbin, but when a bobbin is placed on it the thread is first run through the eye near the center of the standard, then through the stop-motion eye, then up through the eye at the top of the standard, down through an eye in the lever *e*, through the tension-weight eye, and then through the eye at the top of the hollow spindle, whence it goes to the braid former. This makes a total of six eyes to be threaded. On both styles the short lever at the top is arranged so as to be lifted clear of notches in the top of the spool by the tension of the thread, but when this tension ceases the lever drops into a notch and prevents the bobbin continuing to unwind.

FIG. 11.

FIG. 12.

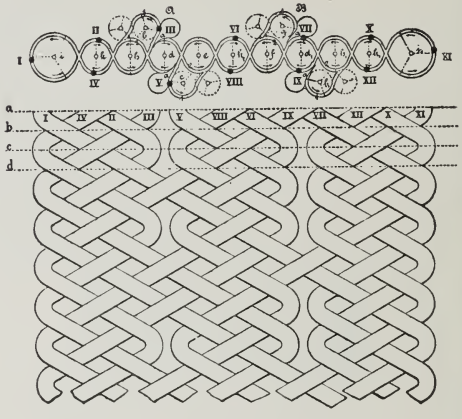


FIG. 13.

FIG. 11.—Vertical bobbin holder. FIG. 12.—Bobbin carrier, showing the outside tension weight.
FIG. 13.—Courses of bobbins in making three-line lace.

VARIATIONS REQUIRED FOR THE VARIOUS WEAVES.

For making ordinary braid two gears are of course the least possible number that can be used. On large lace machines there may be as many as 60. In making the simple "soutache" braid previously noted the horn gears at the end are always made with an odd number of teeth and the middle gears with an even number of teeth. The reason for this is readily seen, as the end gears have to carry each bobbin completely around and start it in between two other bobbins on its return course. The end gears, having a tooth more than the middle gears, also incidentally tend to make a better selvage.

For plain soutache braids the end gears usually have five horns and the middle gears four. For diamond pattern flat braid the end gears may have three horns and the middle gears two, but as ordinarily produced this braid is made with two threads instead of one in which case they have six and four horns, respectively. For Hercules flat braid the end gears have seven horns and the middle gears six.

In making round braid there is no reversing, and as each bobbin repeats continually the same course, the gears all have the same number of horns and these are made of an even number. Barmen lace

are made in three styles, either two, three, or four threads to a "Litzen" or course, so the horn gears for this work are made with four, six, or eight horns, according to which is desired. There must always be at least double as many horns as there are bobbins, so that each bobbin carrier pin in shifting from one gear to another will find a vacant notch ready for occupation.

The total number of bobbins for making Barmen lace simply depends on the design and the size in which the machine may be built. Of the four-thread Barmen laces the highest number of separate "Litzen" or tracks at present used on machines here is 24, which gives a 96-thread lace. The largest two-thread machines have 60 separate tracks or courses, or a total of 120 threads braiding together. Laces up to 10 inches wide can be made on such machines. These are the largest Barmen lace machines built. They have a diameter of 3 meters (meter=39.37 inches) and cost 3,000 marks ($714) each, but there are only six as large as this as yet used at Barmen.

MODIFICATIONS NECESSARY FOR MAKING THREE-LINE LACE.

As the tracks on a Barmen lace machine do not overlap each other and are separated by switches, the horn gears at the ends of the courses do not meet and special horn gears have to be employed in addition to the regular ones. This is clear from the fact that the grooves in the top plate of the machines follow very nearly the pitch line of the gears underneath. In fig. 13 will be seen—projected on a straight line for convenience in explaining—the grooves that are used around the circumference of a Barmen lace machine for making a particular lace. This lace is called a three-line four-thread Barmen lace. It is made with 12 threads, and dots marked I to XII in the figure show the position of the 12 bobbins at the commencement of the lace figure on line *a*. It is seen that there are three separate courses, consisting of four separate circles for the two outer courses and five for the inner. The two circles in between are courses that are occupied only when the switches are open and at other times they and the auxiliary horn gears outside run empty. The lace is called three-line, because there are three distinct stripes and these interlace only at intervals, the first being when bobbin No. I and bobbin No. IX change places. The method of interlacing is shown so clearly by the diagram as to need no explanation.

THE BRAID FORMER AND TAKE-OFF ROLLERS.

The threads collect as braided together at the braid former above the center of the machine and the finished braid is drawn off by the take-up rollers clear of the machine and falls into a can placed alongside. The braid former consists of an eye, which may be of any shape desired. For heavy or complicated work it is necessary that the braid forming shall be assisted by some device to beat up the threads and compact them in a fashion similar to the beating-up work done by the forward action of the lay in the ordinary loom. For some styles of braids this is performed by means of two combs on long arms which swing in toward the braid former along the course of the forming braid. In others there are arranged above the braid former an eccentric arrangement with pivoted arms, and these arms hold curved wires which swing in radially toward the braid former

and beat up the interlacing threads. This arrangement is shown complete in fig. 9.

The take-up motion consists of three rollers which draw off the finished braid. Their speed can be regulated by change gears and their distance apart adjusted according to the thickness of the braid. Some are arranged so that only one roller is fixed and the others held in position by springs. For braided work of irregular shapes calender rollers are dispensed with and the material drawn off by the friction of one or two wrappings around a large wheel, which may have grooves cut in it. For very irregular shapes the material has to be drawn off by hand.

ATTACHMENTS FOR WEAVING SPECIALTIES.

For special effects Barmen lace machines are made with other attachments and special arrangements. One arrangement consists of introducing extra threads from an outside source for making a core, around which the regular threads from the carriers interweave. Such extra threads are called distinctively "warp threads," and are usually drawn from stationary bobbins placed on the floor under the machine and drawn up through hollow bolts into the braid being formed by a set of interlacing bobbins.

Another arrangement for producing specialties consists, as previously stated, in varying the tension of the threads by means of hanging weights of different sizes on particular threads. This prevents the braid running in a straight line and produces wave and other similar effects.

Another special device is that for making loops. There are several patented arrangements for this, but the principle used in all is that of a straight wire pointing from a certain place just over the tops of the revolving bobbin carriers toward the braid former. The threads pass under it to the braid former without being affected, but at intervals the outer end drops momentarily on to the top of a carrier spindle, when the thread of that bobbin passes over the wire and is thereby caused to make a loop. The carriers are usually so arranged that part of them have projections at the top to strike and pull down this wire for the second that they meet, while the other carriers, being without these projecting collars, pass under without being touched.

REGULATION OF THE PATTERN—THE JACQUARD SYSTEM.

It has been previously shown that on Barmen lace machines the bobbins from the separate braids being made only interweave when the switches between the separate courses are open. The pattern therefore depends on the order in which these switches are opened and closed. There are three separate methods of accomplishing this. The oldest and simplest plan is to fasten vertical pins in the switch tongues and then provide special bobbin carriers with projecting collars which will strike these pins and open and close the switches either for their own passage or that of a succeeding carrier without collar. This arrangement permits of only short patterns and is now little used except for special purposes.

The second system consists of a series of notched disks revolving on a horizontal shaft at the side of the machine. The notches correspond to the distances of the carriers on the machine, and movable

ngers are attached to each disk and can be clamped into any notch s desired, and each finger on striking against the lever pin below auses the connecting lever to open or close the particular switch to vhich it is attached. This system also does not permit of sufficient ariety, and while there are a good many machines of this type at Barmen they are nearly all old machines, and the new machines have he Jacquard arrangement, which is shown in fig. 9. It is seen that n this third method the pattern is fixed by means of the perforated asteboard cards running over the revolving square of an ordinary acquard, so that where there is a hole in the card a needle swings in nd its connecting lever moves a particular switch and where there is o hole met the needle can not shift the switch. The patterns are tamped on punching machines exactly the same as for the ordinary oom Jacquard work.

ARRANGEMENT AND SPEED OF THE MACHINES.

Large lace machines are mounted on separate tables with separate elts, but the majority of the machines at Barmen are mounted in sets f 10, there being 5 on each side of a short central shaft driven from belt at the end. This central shaft carries bevel wheels, which gear vith horizontal bevel wheels, and thence transmit the power through pur gearing to the carriers and take-up attachment of each machine. Between each separate machine and the bevel gears are often inter- osed clutch gears, so that any particular machine can be thrown out f gear without stopping the others.

The shaft of the braiding machines is usually run at about 75 evolutions per minute, and the speed of the ordinary braiding ma- hines is given by manufacturers as from 180 to 250 turns of the iandle per minute. This is a wide range, but the range of the work s equally wide, and the speed is varied not only according to the com- lexity of the particular design, but also according to the skill of the perator. The speed of each machine or set of machines can be uickly changed by means of change gears. These machines are rranged so that one turn of the handle—this handle may be seen in ig. 9, and is for the purpose of turning the machine backward or orward by hand—is made while two carriers are passing any par- icular point on the guide grooves. There are, therefore, two inter- acings, corresponding to two "picks" of a loom, made for each iandle turn, and the number of crossings will usually be two times 200 or 400 a minute. For Barmen laces the speed is slower and is usually given in Jacquard movements per minute instead of handle turns per minute. The speed here also depends on the design, the workman, and the strength of the material, and is given by manufac- turers as ordinarily ranging between 120 and 170 Jacquard move- ments per minute. By this is meant that 120 to 170 Jacquard cards are presented to the needles every minute.

YARN SPOOLING—FINISHING AND PACKING LACES.

The lace factories buy their yarn from spinners, some of it being imported. This is usually in skeins and is then wound on the spools or bobbins of the particular size and shape required. Some factories let this work out to home workers, who do nothing else. There are 36 such establishments in Barmen, employing 280 operatives, who

do only this spooling for the factories. In some of these places the work is done by power and in others by hand. In the regular factories I also noticed men operating handwheels, but this is usually for spooling on bobbins of special sizes or sizes needed in limited numbers.

After manufacturing some braids and laces are considered complete, but the majority of them are run through a small calendering machine to finish and in some cases to size. The machine is made so that the laces first pass over live steam to soften them and then through the ordinary steam-filled calender rolls. They then go to the shipping room, where they are inspected, wound on cardboard, cut up into the required lengths, ticketed, wrapped, put in cardboard boxes, and these cased. The cardboard on which the laces are wound is held between two flat-slit clutches and then revolved by hand until the desired length is wound on, when the roll is taken off and a new piece of cardboard inserted.

PRICE OF MACHINES—WAGES AND HOURS OF OPERATIVES.

The price of Barmen machines varies greatly according to the number of spools, the number of tracks, the particular attachments desired, etc. One manufacturer stated that his charges were based on 55 marks (mark=23.8 cents) per Litzen or track, while another gave his prices as ranging from 420 marks for a 6-litzen lace machine to 3,000 marks for a 60-litzen lace machine with 2 threads to a litzen. The price may therefore be figured as about $12 per track, or $288 for the ordinary 24-track lace machine.

For ordinary work at Barmen one operative, either man or woman, runs one set of 10 heads, and makes 4 marks a day or 24 marks a week. The hours vary considerably at different factories, but the usual time seems to be fifty-seven hours a week. The usual arrangement is from 7 a. m. to 12 and from 1 p. m. to 6.30, with fifteen minutes for the regular 4 o'clock stoppage and only six hours on Saturday.

In Saxony I found that the majority of the textile factories did not stop more than an hour earlier than usual on Saturdays, but around Barmen the operatives demand the Saturday afternoon and prefer to have this half holiday and make up the time during the other five days. The total hours per week are also somewhat less than in Saxony.

[One photograph showing cord-braiding machines in operation, and seven additional text figures of different parts of lace-making machines, together with eighteen samples of the various kinds and styles of braids and laces manufactured at Barmen, accompanying the foregoing report, are on file in the Bureau of Manufactures.]

PLAUEN DISTRICT.

DEVELOPMENT OF THE MANUFACTURE OF EMBROIDERED OR ETCHED LACES.

Of the many branches of cotton manufacturing, that of lace making is the most refined and artistic. The products of this branch, more than those of any other, are used for purposes of ornamentation, as distinguished from wear and durability. This is especially true of the Plauen lace, which is used almost exclusively to trim ladies' dresses and to make fancy blouses, overskirts, etc.

Of the four big European centers for lace and embroidery, Nottingham and Calais produce mainly fancy lace on the Levers lace machine. St. Gall makes little lace, but employs both the hand and the chiffli power machine for embroidering on muslin and cambric. This work is for utilitarian purposes, such as underwear, corset covers, etc. The Plauen manufacturers work on an entirely separate branch of the industry, as they use the embroidery machine for making lace. The Plauen product is known as embroidery or etched lace.

ANNUAL PRODUCTION, AND EXPORTS TO THE UNITED STATES.

The Plauen district produces annually embroidery laces to an estimated value of 70,000,000 marks (mark=23.8 cents). Of this only about one-fifth is retained for use in Germany, and the remainder is exported to other countries, especially to the United States and England. The figures for laces and embroideries shipped from Plauen to the United States in 1907 are as follows:

Laces and embroidered articles:	
Cotton	$3,211,784
Cambric	118,000
Silk	159,015
Artificial silk	84,013
Linen	29,992
Lace curtains	18,746
Torchon lace	1,353
Total	3,622,903

The total value of all exports from Plauen to the United States in 1907 was $4,479,021, so it is seen that laces and embroideries form three-fourths of the total, and the growth of this business is worthy the careful attention of American manufacturers.

HISTORY OF THE INDUSTRY.

Plauen in Vogtland, as it is known, to distinguish it from another Plauen near Dresden, is loftily situated in the southwestern section of Saxony. In ancient times it was the seat of the Vogt (Advocatus regni), and it is now the capital of the section of Saxony that is still called, as in ancient times, Vogtland. The Vogtland and the neighboring portion of southern Saxony known as the Erz-Gebirge have been centers for the textile industry for centuries.

This section is situated on the old highways of trade that ran between northern Germany and Bohemia and Bavaria, and as the soil is shallow and the people naturally a home-loving and an indoor race, they started cottage industries, especially textile industries, at an early date. This section became noted for its hand embroidery work, and the knowledge acquired in this line was handed down from father to son.

The modern work may be said to date from 1857, when the first hand machine for making embroidery was introduced from Switzerland, but it was not until 1881, when Herr Bickel, at Plauen, originated the idea of embroidering on tulle, that the specialty was started that has since made Plauen famous. The idea of embroidering on net was later followed by that of embroidering on a material to be chemically removed so as to leave only the embroidered lace itself.

DEVELOPMENT AND PRESENT CONDITIONS.

When this specialty was started there were only some 30,000 people in Plauen, but in the quarter of a century that has elapsed since then the population has more than trebled and is now given as about 110,000. This population has gathered here from all over Germany, being attracted by the higher wages. For a while this specialty was almost a monopoly of this one place and the demand was such that large profits were made. Even to-day this specialty is more developed in this one town than in any other country of the world, and through its lower wages and its highly trained personnel it is enabled to sell millions of dollars worth of these goods every year to great textile countries like England and the United States.

The profits in this business have been so good that not only were skilled and unskilled operatives attracted here from all over Germany and from other countries, but men in other lines of trade started in business on their own account. Such men would buy or rent a few machines and employ a few skilled operatives to run them. In the prosperous period they easily got orders, and starting with no knowledge of the business at all some gradually built up large firms. At the present time (March, 1908) the business is feeling the stress of hard times, and many of these immature firms that have been started in the last few years will probably go under. The financial crisis and the consequent lack of buying orders from the United States is being severely felt, and all the factories are running short time and some have closed down. Any disturbance of the buying power of the United States is felt in every textile center in Europe, and the most practical method to avoid disturbing these markets is to make such textiles at home.

Embroidery and lace making is scattered throughout the Vogtland and Erz-Gebirge, but centers around Plauen and the neighboring towns of Auerbach, Falkenstein, and Treuen. Eibenstock is also quite a center, but works on a special line.

HAND-MADE LACES AND BEAD EMBROIDERIES.

In considering lace work in the Plauen district it may be noted that lace can be made by three separate methods, being known as needle, pillow, and machine.

Needle lace is made with the needle by hand, and lace so made was called in old times "needle" or "point" lace. Pillow lace is made by interweaving by hand the various threads around pins stuck in a pillow. Machine-made lace is a quite recent development, but embraces a good many systems.

Hand embroidery is still employed in upper Vogtland, and is made with either a regular sewing needle or with the tambour needle. It is made on a cotton or linen ground. Both needle and pillow lace are occasionally to be found also, though only to a limited extent. The manufacture of hand-embroidered blouses and robes, also of the so-called "Battenberg" articles—little tapes joined together by needlework—still flourishes in this section.

Eibenstock is the largest hand-embroidery center, and has a reputation for rich designs and fancy work. To a larger extent it is noted for its bead embroideries. Polished Bohemian beads of various colors and spangle made from a mixture of gelatine and cellulose

are sewn on by hand and used to make dress trimmings, edgings, skirts, collars, belts, etc. Bead embroideries made on black tulle and beadwork formed on metal tulle also have a good sale.

There is still some hand work done at Plauen itself in embroidering colored wash articles, but this is more in the way of supplementary work, and the increasing number of women required in the schiffli factories tends to still further restrict this home work.

The great bulk of the Plauen articles are made on machines which are either worked by hand or power, the chain-stitch articles being made on the tambour machine, ordinary white embroideries on the hand-embroidery machine, and the laces on the schiffli power machines.

The chain-stitch embroideries, as made on the tambour machines, and on the lace sewing machines of varied types, are mainly used for decorative home work, such as curtains, doilies, centerpieces, etc.

The regular white embroidery in the Vogtland is mainly made on the hand-embroidery machines, and is similar to the Swiss embroidery. It is made on a permanent foundation of muslin, cambric, or nainsook. The Plauen work in this line is mainly of the cheaper varieties, for they can not compete with the Swiss manufacturers on the higher and more perfected designs. The reason for this is that this white embroidery is a secondary branch at Plauen, while at St. Gall it is the main business and has been brought to a high degree of perfection in all details of the work.

GERMAN VERSUS SWISS WORKERS AND PRODUCT.

The Swiss operative is more skilled than the German operative, and his wages in this line are smaller. From figures obtained at both centers in regard to this industry it would seem that the German worker receives the same number of marks (mark=23.8 cents) that the Swiss worker does francs (franc=19.3 cents). Another important point is that the bleaching at St. Gall gives more of a dead white bleach than does that of Plauen. The St. Gall bleacheries obtain their water from the Bodensee (Lake of Constance), while at Plauen they depend partly on wells and partly on a small river, the Weiss Elster, which is frequently muddy.

The hand machines in use at Plauen are similar to those described in my report on the Swiss industry,[a] but are usually 5 yards wide instead of $4\frac{1}{2}$, as customary in Switzerland. This machine was introduced from Switzerland in 1857, and in 1863 there were 100 in operation. This number gradually increased until there were some 4,800 in 1893; since then they have not been able to stand the competition of the power machines and have decreased in numbers until they are estimated now at not much over 2,500. Each machine is estimated to produce 3,000 marks worth of embroidery a year, so their total production may be roughly figured at 7,500,000 marks. The bulk of the work in this line is for home consumption in Germany and little is exported.

THE PRODUCTION OF SCHIFFLI-MACHINE LACES.

The Plauen laces are made on the schiffli machine, and therefore, whether tulle laces, guipures, imitations of real laces, etc., are all classed as embroidery laces. The number of schiffli machines used

[a] Swiss Embroidery and Lace Industry, monograph, published by the Bureau of Manufactures, pp. 43.

at Plauen has steadily increased in the past few years and is now estimated at 7,000. Each machine is estimated to produce at least 10,000 marks of lace a year, so that the total production in this line may be figured at fully 70,000,000 marks annually.

Although this Plauen specialty was inaugurated in 1881, it only came into practical operation in 1883 through a Plauen manufacturer using a tulle foundation and making articles to imitate hand-made lace. This new lace became popular and profitable. Later the further idea was evolved of using a temporary background to be removed after the stitching was completed. For this purpose chemical cloths are used. The stitching is made on this as on an ordinary muslin background, and then acids used to dissolve the cloth and leave only the embroidered lace effects.

There are a good many patented processes, and every other manufacturer at Plauen has his favorite method. The principle of all of them, however, is that of using a chemical cloth of vegetable fibers when the embroidery thread is of animal fibers and a chemical cloth of animal fibers where the embroidery thread is of vegetable fibers. Thus, for cotton the chemical cloth is usually woven of wool, but for silk embroidering the chemical cloth is of cotton. In the former case the embroidered cloth usually passes through an acid bath, which dissolves the cloth and leaves unaffected the cotton lace. With silk or artificial silk there can be no wet treatment, hence the finished material is usually run over a gas flame and the foundation material burned off. In some cases a hot iron passed over the back of the material is sufficient to accomplish this purpose.

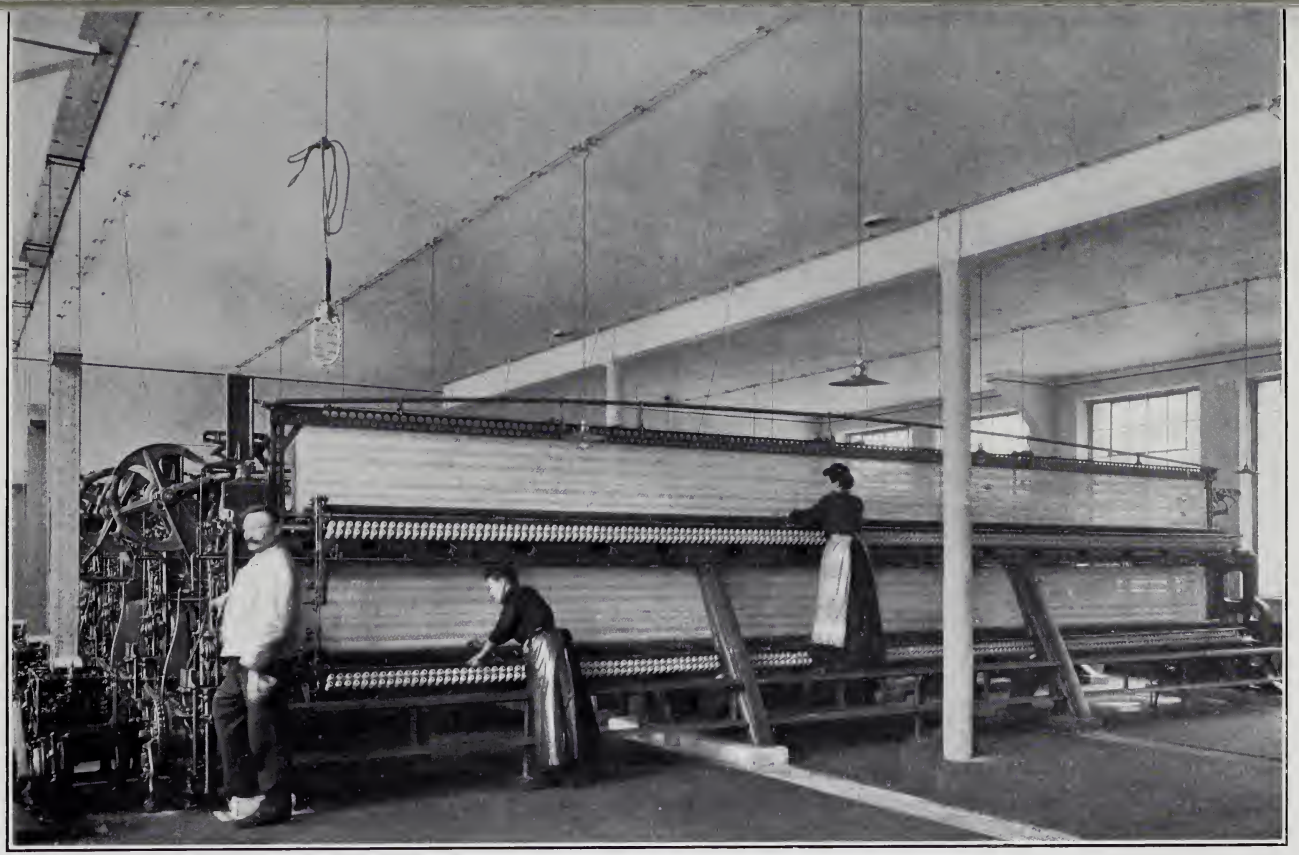
DESCRIPTION OF THE FOUNDATION MATERIALS.

Four samples of the main foundation materials used in this industry are forwarded [on file in the Bureau of Manufactures]. The principal one is a muslin, of which every two warp threads, each shedding separately, however, lie together, so that the muslin has also a rep effect. This muslin is made in England and Germany and none is made in the United States. The bulk of the Plauen demand is now supplied by Mülhausen, in Alsace-Lorraine. This muslin is usually 120 centimeters (47.25 inches) wide and has 88 warp and 84 filling threads per inch. The present price at Plauen is 66 pfennigs a meter, which is about 14.4 cents a yard, less 2 per cent discount.

Another sample of background is a woolen cloth, made of red warp and white filling, and chemically prepared so as to readily dissolve when placed in a bath of a certain acid. This particular cloth is 160 centimeters (63 inches) wide, 54 by 54 construction, and the present Plauen price is 98 pfennigs a meter, say, 21.4 cents a yard, less 2 per cent discount.

The third sample shows one of the regular styles of bobbinet, made with 38 holes to the square inch. These nets are made very wide, so as to be the full width of the embroidery frame. The particular sample shown was 550 centimeters, or 6 yards wide, and the present Plauen price is 3.65 marks a meter, say, 80 cents a yard.

The fourth sample shows a square net. This net was 160 centimeters (63 inches) wide, has 17 meshes per inch each way, and the present Plauen price is 1.35 marks per meter, say, 29 cents per yard, less 2 per cent discount.



A 10-YARD SCHIFFLI MACHINE IN USE AT PLAUEN, THE LARGEST SINGLE MACHINE MADE.

The tulle used at Plauen formerly came almost entirely from Nottingham, but there are now tulle factories at Chemnitz, Plauen, Mülhausen, and other points, so that the larger portion of this foundation material is now obtained in Germany. Though tulle is not made in the United States, the superintendent of the large tulle factory at Chemnitz is an American. The bulk of the chemical cloth is also obtained in Germany. The general term for all laces made on chemically prepared cloth is guipure lace.

Laces can be made in greater variety of effects on the embroidery machine than is possible by any other method, except that of hand-made lace. The variety is much greater than is possible in the case of white embroideries, and is also greater than can be produced on the Levers lace machine, as the latter can not make the heavy and raised effects. Laces are made on the schiffli machine at Plauen in imitation of every style of lace, from the heavy "Venice points" with relief to the lightest and finest old point laces. Some are so skillfully made that only an expert in this line can distinguish the difference, and whereas only the very wealthy could afford the genuine lace, the modern lace is made for the masses.

TECHNICAL TRAINING OF EXPERT DESIGNERS.

In making lace the salability of the finished article depends more on the artistic design than it does on the mechanical finish, and the designers of the finer class of laces are highly skilled men. The German Government fosters the creation of special schools located at every center that produces a specialty. In pursuance of this plan there is at Plauen a Royal Industrial School that is one of the best in Germany, and that has had a good deal to do, through the trained designers it has turned out, with extending and perfecting Plauen's special industry of etched lace making. Connected with the school is a museum which has one of the finest collections in Europe of old and modern laces. Such a museum is of great help to the student. In order to keep in touch with the industry there are branch museums at Eibenstock, Annaberg, Falkenstein, Auerbach, Glauchau, Meerane, and Frankenberg, the exhibits of which are exchanged with the central museum at Plauen.

The result of the study of the old designs by the young men being trained for a life work as designers has shown itself not only in the imitation of the old laces so exactly by machine as scarcely to be distinguished from hand work, but in the great number of new forms and combinations that are continually being introduced and by means of which the Plauen manufacturers are enabled to get the best prices and keep just a step ahead of their competitors.

MADE-UP GOODS—NUMBER AND ARRANGEMENT OF FACTORIES.

In connection with the manufacture of laces there has grown up a large business at Plauen in the manufacture of made-up goods. The large factories run this in connection with their regular manufacturing business, usually in a separate building, however, though it is really a special line in itself, and there are firms who do nothing else. For this work laces are manufactured in the special shapes desired and then sewed and fitted together to form collars, blouses, or whole dresses entirely of lace work. This sewing together is done

so skillfully on the finer work as to be almost indistinguishable, and the shaping and arrangement of the different pieces to form the finished article requires not only skilled hand work but also skilled brain work. The head women employed on this work have to be artists, and they get 300 marks and more per month.

The embroidery and lace manufacturers, of which there are some 450 in and around Plauen, are all private firms, with very few exceptions. The larger factories are mainly four stories, but many prefer to have only a part of the factory in several stories, usually the offices, storage, and finishing rooms, etc., and to have the bulk of the machines in a single-story sawtooth-roof building, so as to get perfect light and steady floor.

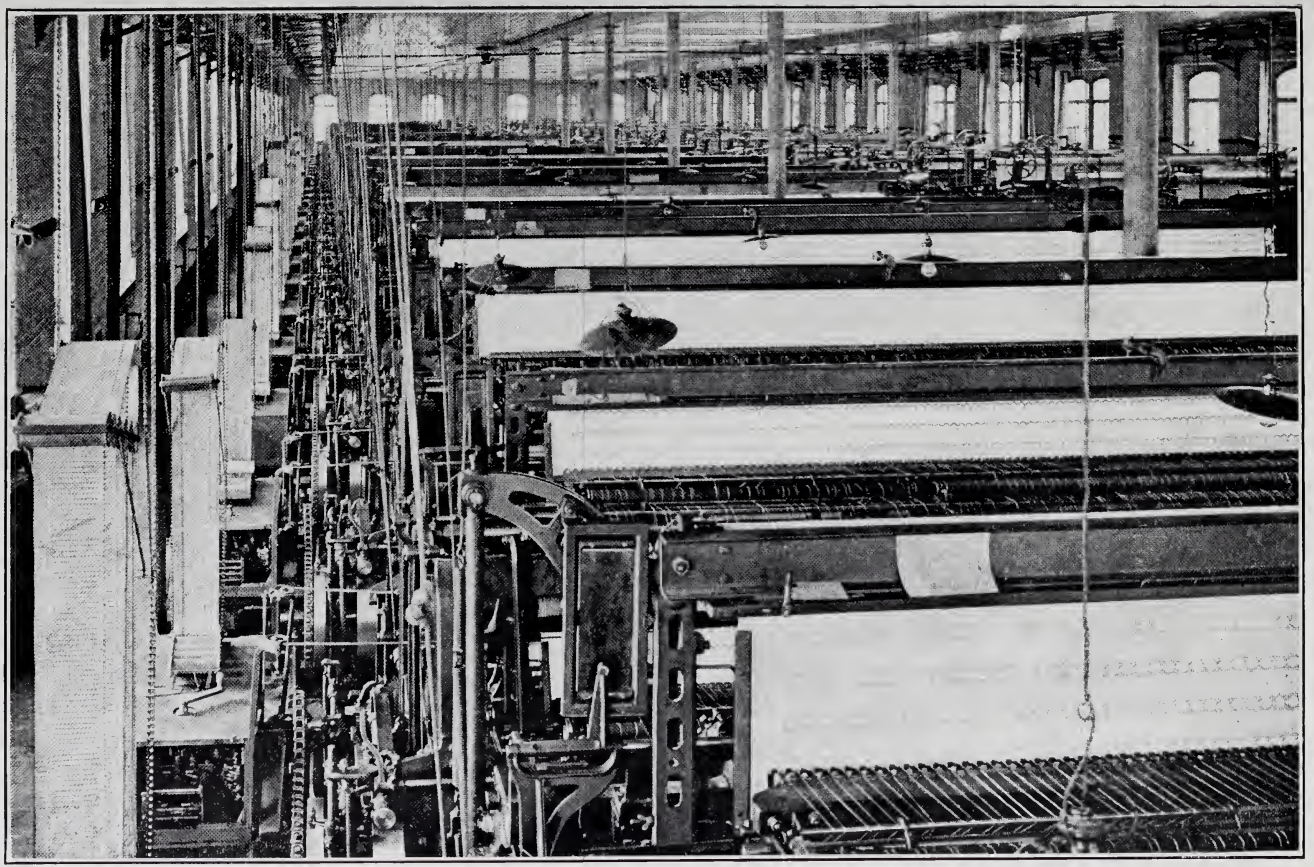
A typical factory is illustrated below, showing part of the building as four stories and part as one story. The long building in

A typical lace factory at Plauen.

the background is one of the model tenements that have been erected at Plauen for the special purpose of improving the housing conditions of the workers.

AUTOMATIC MACHINES AND THEIR COST.

Plauen uses a good many automatic machines, and their use is increasing. In this respect they are ahead of St. Gall. Their cost, however, is such that only the larger firms can afford them, but as a larger production with less wage cost is secured, the machines pay for themselves. On the pantograph machine there has to be employed a man as pantograph worker or "stitcher," one girl to watch the work, keep the bobbins filled, etc., and one girl to put the bobbins in the shuttles. On the automatic machine the stitcher is dispensed with.



AUTOMATIC LACE-MAKING MACHINES USED AT PLAUEN.

Very wide embroidery machines are now made by coupling together two 6¾-yard machines, so as to be worked by the same pantograph. There are a few of these in use at Plauen, but they are not liked by the operatives.

At one of the largest lace factories visited at Plauen were found 70 pantograph and 90 automatic machines. The majority of the machines were 5 yards long, using a double row of needles. The 4/4 rapport machine (needles spaced 1 French inch or 1.08 English inches apart) has 168 needles on each row, the 6/4 has 112, and the 12/4 has 56 needles on each row. The 5-yard pantograph machines cost this factory 4,500 marks and similar automatic machines 8,500 marks. The 9-yard automatic machines cost 15,000 marks. The regular charge at Plauen for the automatic attachment is 4,000 marks.

SPEED OF THE MACHINES AND PAY OF THE STITCHERS.

The speed of the embroidery machines was given by the superintendent as 120 stitches a minute, but on most of the work 90 would be averaged by the best stitchers, while the automatic machines could be counted on for 90 to 100. While this is the speed when working, there is necessarily loss of time for arranging the cloth, repairing some slight derangement, etc., and the actual production is much less than the theoretical.

At this factory the superintendent said that the best stitchers made from 220,000 to 260,000 stitches, according to the design, in a 63-hour week. At Plauen the "stitches" are given in terms that mean just double the terms at St. Gall. Thus at St. Gall the work done when a needle went through and back was called a stitch; at Plauen this would be figured as a double stitch. Thus the stitches made as above would be 110,000 to 130,000 a week at St. Gall, which is at the rate of about 32 double stitches per minute.

The stitcher was paid at the rate of 18 pfennigs (pfennig=about one-fourth of a cent) per 1,000 stitches, so on the supposition that he made 240,000 stitches a week (figuring on Plauen stitches), he would make 43.20 marks, or $10.28. The average stitcher gets probably 30 to 35 marks a week. On special work the stitch rate varies considerably and in some cases is 35 pfennigs per 1,000 stitches; the amount of work turned out on the fancy designs is less, so that the weekly wages are not augmented in proportion.

WAGES OF OTHER FACTORY EMPLOYEES.

The two girls on a machine, the one to watch the work and the other to keep the small shuttles filled, are paid, respectively, 18 and 14 marks per week. Their wages are the same usually, whether working on the pantograph machine operated by a "stitcher" or on a self-operated automatic machine.

The card punchers who operate the machines that punch the holes in the Jacquard cards for use on the automatic machines get high wages. The most expert can punch up to 6,000 holes a day. As this work requires a well-trained man, who is both quick and careful, the factories often employ the men by the year. At the factory in question there were six men so employed who were paid by piecework and guaranteed 200 marks a month. They really made 240 to 300 marks a month.

At the time of my visit the factory, owing to the curtailed orders, through depressed financial conditions, was only operating a few embroidery machines and had only one card puncher at work, but the others were drawing their 50 marks a week just the same.

This factory in normal times works an 11-hour day, with 8 hours on Saturday, or 63 hours a week. Factory employees are paid every Friday and home workers fortnightly.

EARNINGS OF THE HOME WORKERS.

General scissor and needle work, such as cutting off the threads between the embroidered portions, and repair work are mostly done at home. For cutting off threads the rate is 1 pfennig per thread running the width of the 5-yard piece. For sewing together collars, etc., and for repairing net, etc., the rate is 18 to 20 pfennigs per hour for home work and 20 to 22 pfennigs per hour for factory work, so that the weekly wages are about 12 marks.

The lace-machine work is more concentrated in factories than is the white embroidered work, though there is a very large number of lace machines worked singly in the homes or in lots of two to a dozen in rented rooms. In this case the manufacturer usually supplies the foundation material and the design and pays the man who owns the machine, the "Lohnesticker" as he is called, a fixed price per thousand stitches, and he has to provide out of this all the costs of manufacture, including yarn, wages, power, etc.

A great many of these lohnestickers work on rented machines, and in other cases they buy the machine on the installment plan. The latter, however, does not seem to be as generally the case as in Switzerland. The present rate supposed to be paid the lohnesticker for ordinary standard work is 70 pfennigs. Owing to the depressed conditions I found some taking the work as low as 56 pfennigs per 1,000 single stitches (two rows at 28 pfennigs rate to the row), but there is no profit whatever at the latter figure.

MEAGER PROFITS OF THE COTTAGE OPERATIVES.

Figuring that the lohnesticker gets off 180,000 single stitches on each machine, which is a good rate of work for first-class stitchers at home, and that he is working on regular designs at 70 pfennigs per 1,000 stitches, he will earn $30 a week from the factory for the work produced on each machine. His costs of getting off this work may be figured as follows at present rates of yarn and wages:

Cost of embroidery and shuttle yarn, say 2 marks per 1,000 stitches	$8.57
Stitcher's wages, at 18 pfennigs per 1,000 single stitches	7.72
Wages of machine hand, at 3 marks a day	4.26
Rent	.71
Electric power	.47
Heating, light, and supplies	1.43
Interest and depreciation	1.90
Repair and inspection of goods	1.19
Machine repairs	.47
Sick insurance, porterage, and incidentals	.83
Allowances 1½ per cent	.45
Total	28.00

This leaves the lohnesticker only $2 profit on his machine for the week's work, and if the rate is 28 pfennigs per 1,000 stitches (56 pfennigs per 1,000 for the piece) he is actually losing money, unless

he has only one machine which he operates himself at home, in which case by cutting all expenses down to the minimum he can make a very small wage. In times like this the home workers who depend on the factory to supply them with work naturally feel the depression first. The cost of operation varies according to the conditions under which the home work is done, but the foregoing figures are sufficiently accurate to give an idea of the general conditions and of the proportionate costs of ordinary work.

RATES CHARGED FOR ELECTRIC LIGHT AND POWER.

All of the factories use electric power, as do also a good many of the lohnestickers. One or two factories have their own plant, but the great majority get their power from the electric plant owned by the city, which has a monopoly for supplying electric power within the corporate limits. For light the rate is 70 pfennigs per kilowatt hour, less 12½ per cent, but for power a special rate is made of 20 pfennigs per kilowatt hour, less 15 per cent, with the condition that contracts must be made by the year on a basis of at least 300 kilowatt hours. A reduction of 15 per cent is made for every 100 kilowatt hours up to 20,000. If there is an annual consumption of more than 20,000 kilowatt hours, then the rate per kilowatt hour is reduced to 16 pfennigs flat. For current for heating and for electro-chemical apparatus an additional 10 per cent is added to the regular power rates. The ordinary 6/4 rapport pantograph machine 5 yards long takes about one-fourth horsepower and the similar automatic machine nearly one-half horsepower.

[Illustrations of factories and machines, and one sample of embroidered work in colors, forwarded by Mr. Clark, are on file in the Bureau of Manufactures.]

54552—08——6

RIBBON WEAVING.

MODERN MANUFACTURING METHODS—COSTS AND PROFITS—LARGE SHIPMENT OF PRODUCTS TO THE UNITED STATES.

A ribbon loom uses a series of shuttles for weaving a number of narrow bands, and for a great variety of purposes. It is made in various widths and divisions, and either with or without attachments, such as leno and Jacquard apparatus, etc. The German ribbon manufacturers touch all sides of the textile trade. They make plain and fancy weaving, imitate lace work, imitate embroidery, imitate braiding work, and, in fact, make everything, either plain or fancy, that can be woven in narrow widths.

The materials employed on the ribbon loom are of all kinds—cotton, wool, silk, linen, jute, rubber, gold and silver threads, etc. The products include plain ribbons or tapes in plain, twill, satin, or rep weaves; name bands for shoe and coat straps, cap and hat bands, hat forms of iron yarn, laundry ribbons, velvet edgings, ribbons interwoven with rubber threads for boot elastics, tubular elastics, bandage holders, etc.; carriage braids, cords, girths, straps, belts, hollow bands and neckties, Venetian-blind bands, ribbon-loom lace, handle and other stiff bands, corset and apron trimmings, dress trimmings, millinery ribbons and trimmings, fancy bands with either warp or filling figuring, etc.

CENTER OF RIBBON-LOOM INDUSTRY.

Barmen is the center of this specialty in Germany, and in 1907 this town alone shipped to the United States $990,900 worth of hat bands and ribbons, besides galloons, trimmings, edgings, name bands, elastics, etc., so that of the product of the ribbon looms at Barmen there was shipped to the United States some $1,500,000 worth in this one year. The majority of these goods should have been made in the United States.

The great bulk of the German "Bandweberein," or ribbon-loom manufacture, is carried on at Barmen, but there is also considerable manufacture in the neighboring towns of Elberfeld and Crefeld and a smaller center around Pulsnitz and Gross-Rohrsdorf, in Saxony.

Barmen is the center both of the German ribbon-loom work and of German braiding work. These specialties make Barmen an important textile center, and to show the range of the textile industries at this place a list of the 34 textile industries of this town, with its three

small neighbors, follows, the list being furnished by the Barmen Chamber of Commerce as showing the situation January 1, 1907:

Industries.	Factories.	Operatives.	Industries.	Factories.	Operatives.
Braiding machines	98	5,077	Bleaching and finishing yarn, lace, ribbons, etc	8	174
Ribbon loom	864	6,974	Finishing yarn, lace, ribbons, etc	13	87
Ribbon looms and braiding machines	13	2,511	Iron yarn and sewing thread	5	512
Ribbon looms and braiding machines, dyeing and finishing	1	194	Iron yarn and sewing thread and braiding work	4	1,228
Ribbon weaving and iron-yarn manufacture	1	490	Iron yarn and sewing thread with bleaching and finishing	3	273
Fabrication of elastic goods	20	1,176	Iron yarn and sewing thread with cop dyeing	1	62
Ribbons, lace, and cords (hand work)	43	577	Passementerie fabrication	24	886
Mechanical weaving of mixed goods	9	1,010	Knit goods	3	80
Mechanical weaving and iron-yarn manufacture	1	133	Coverings for smokers' pipes	3	89
Mechanical weaving of upholstery goods	1	193	Mechanical warp preparation	1	29
Cloth manufacture	1	73	Button manufacture (metal and cloth)	12	927
Carpet manufacture	1	433	Turkey-red dyeing	4	230
Spinning, weaving, and printing	1	737	Home spooling	36	280
Piece dyeing and finishing	3	600	Combed knitting	3	11
German blue cotton prints	5	414	Chemical preparation and fine dyeing	7	96
Calendering and finishing mixed goods	3	56	Renters of room and power	17	19
Dyeing and finishing yarn, lace, ribbons, etc	44	995	Prussian High School for Textile Industry	1	3
			Total	1,254	26,629

The foregoing is divided up as follows: Barmen, 877 factories and 21,425 operatives; Schwelm, 364 factories and 3,921 operatives; Hagen, 4 factories and 783 operatives; Iserlohn, 9 factories and 500 operatives.

FACTORIES, OPERATIVES, AND WAGES.

Barmen's many textile industries are more or less specialized, but the main machines are the ribbon looms and the braiding machines. The contrasting figures for 1905 and 1906 in regard to factories, operatives, and total wages are as follows:

Description.	1905.	1906.
Factories—number	1,263	1,303
Operatives—do	24,783	25,991
Total wages—marks	23,786,220	25,862,601
Average wages per operative—do	960	995

Assuming three hundred working days to the year this is $3\frac{1}{3}$ marks, or, say, 80 cents a day. It will be noticed that wages are gradually advancing, and also that more workmen are being employed each year, and this is especially true of the braiding and ribbon factories.

The manufacture of ribbons and similar narrow goods at Barmen is a growing industry and the sales thereof to the United States are yearly increasing. The majority of these goods should have been manufactured in the United States, but the German ribbon manufacturers, notwithstanding the tariff, seem to be able to compete with American ribbon-loom manufacturers in their home market, partly due to the fact that they cater to the market, continually getting out new designs and manufacturing special orders of any size desired. Their costs of manufacture are also less, but wages are increasing yearly. The fact that the ribbon manufacturers will take orders of

any size is one factor that helps them both at home and abroad. On name bands, for instance, with the name woven in silk on cotton tape one-half inch wide, the Barmen manufacturers charge 2 marks (7.6 cents) for one tape containing 12 dozen repetitions of the name, and will punch a Jacquard pattern and weave only one tape if that is all that is ordered.

TYPES OF RIBBON LOOMS.

There are two main types of ribbon looms, the first (represented by fig. 15) having banks or chests of shuttles that move in a straight line to the right and left, like the shuttles of an ordinary loom, but with much shorter travel, while the second type (represented by fig. 16) has shuttles that move in semicircles, the tracks of which cross each other. In a variation of the first type of an ordinary loom as

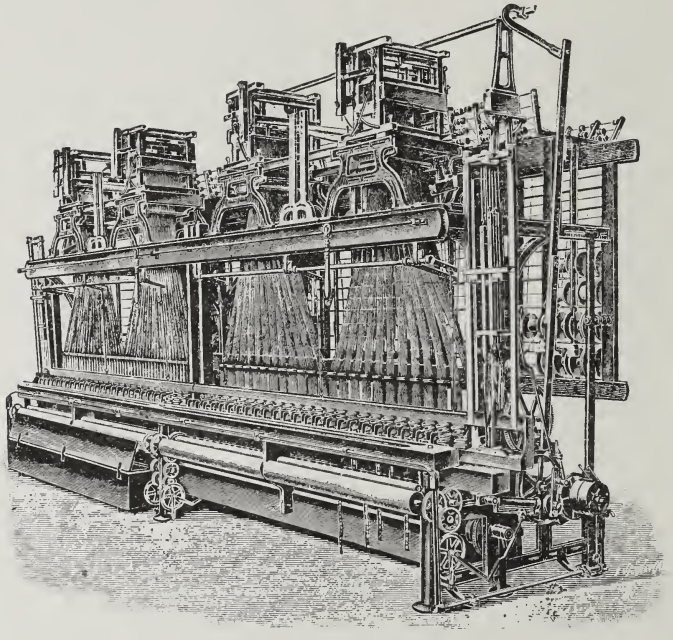


FIG. 15.—First type of ribbon loom.

made in Barmen the shuttles are arranged in banks one above the other and the small warps run through narrow reeds placed in openings in the lay between each bank of shuttles. Each bank consists of six shuttles, but may be of any number from two to eight. Ordinarily six shuttles to the bank is as many as is employed, and three or four is the more common number. The lay in an ordinary loom swings back and forth only, but in most ribbon looms it is also arranged to slide up and down, so as to throw in a particular shuttle say the bottom, the middle, or the top one, through the center of the warp shed.

The shuttles are moved by racks. The shuttles extend out horizontally from the lay, and a couple of small gears fit into the rack in the shuttle. These small gears in turn are moved by means of a long rack placed either at the top or bottom of the lay so as to be clear o

the small warps. Each rack runs the length of the lay. Where there are only two shuttles to the bank there is one rack at the top and one at the bottom. Where there are four shuttles to the bank the lay is thicker, and there are two racks at the top and two at the bottom placed one behind the other, the rear one being deeper, so as to enable it to gear with the second shuttle, and if there are six shuttles to a bank three racks, one behind the other at top and bottom, etc., are required. The curved-shuttle looms are mainly used, without Jacquards, for making cigar bundle bands and similar work, as they are not suited for fancy work, as is the straight loom.

COST AND OPERATION OF LOOMS.

On ribbon looms making plain goods the shafts are moved by cams, but the larger portion of the ribbon looms have a Jacquard attach-

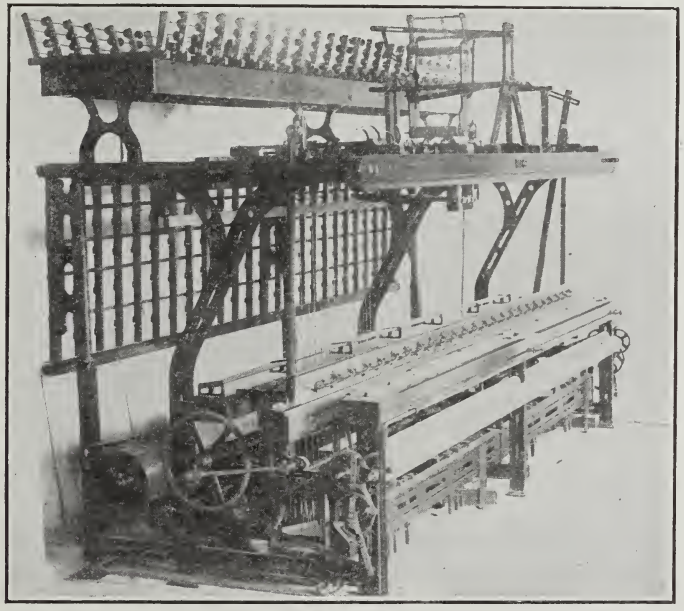


FIG. 16.—Second type of ribbon loom.

ment. The Jacquard arrangement is similar to that of ordinary Jacquard looms. For wide looms, as shown in fig. 15, there are employed four and sometimes six Jacquards. The ordinary ribbon loom is four meters (4.37 yards) wide, makes 20 ribbons at a time, in three colors, and is fitted with Jacquard attachment. The present price of such a loom is given me by one of the largest German manufacturers in this line as 1,500 marks ($357) at Crefeld. The German ribbon looms are much cheaper than the American. They are also made differently, for whereas the American ribbon loom is made of iron wherever possible, not only the gears and racks, but the lay and frame being of iron, the German loom is made of wood, and iron is only used where unavoidable. The lay, racks, frame, etc., of the German ribbon loom are all wood, which makes a lighter and cheaper loom. The German ribbon-loom manufacturers also claim that their system of rawhide gears, interposed between the wooden racks in the shuttles

and the long wooden racks, makes not only a much more silent but a more lasting mechanism than the American loom with iron gears working in an iron rack.

Ribbon looms are made in a great variety of forms, according to the purpose for which intended, from very light looms for plain ribbons up to very heavy looms for weaving girths and belts. The number of divisions—that is, of separate warps—and the width may be as desired. The widest looms are about 8 meters (8.75 yards); possibly a few are over this. In each wide loom there are two independently operated lays, so that each is two looms with one breastbeam. Not only are several Jacquards employed for the wide looms, but the cards may be so arranged that each ribbon is of a different design from that of its neighbor. Each of the separate warps is wound on its own spool, with separate spools for the selvages, but, according to the pattern, the warp may be wound on two, three, or more spools. This is especially necessary where portions of the warp are under a different tension from that of the others. The looms stand some 8 feet high and the ends from the warp spools run over carrier spools and down under a rod to the reed. Each warp thread or set of threads has its own weight attachment to take up the slack.

Leno attachments are common and have a similar needle arrangement of two heddle frames, one behind the other, whereby various designs can be produced in imitation of embroidery and similar work. Sometimes on a six-shuttle bank loom there will be made two ribbons one above the other, each using three of the shuttles.

SPOOLING AND OTHER PROCESSES.

In considering the work of a ribbon-loom factory the first operation is spooling. The yarn is usually bought in hanks, and this, if warp yarn, is wound from the skein onto spools of the required size and may be fitted up with any number of spindles from 4 to 20. Sometimes the yarn is bought from neighboring factories on the spool, and then a number of these spools are wound together directly onto the warp spools to be placed on the loom. Very frequently the factory has no spoolers, in which case it buys the yarn in the numbers and amounts desired of each and has this spooled outside in an establishment that does nothing else. If it is desired to have the yarn dyed, bleached, or otherwise prepared, the factory will also have this done at a special establishment and then spooled and warped at another establishment before they start on their share of the manufacture. The largest factories, even, usually have some of the processes, especially the dyeing or the bleaching, carried on at some place that makes a specialty of this one process. The warp is wound on large spools, while the filling is wound onto small bobbins for the shuttle. The thread from a bobbin goes through spring hooks on either side of the inside shuttle circle and then horizontally out through the hole at the bottom. The wires at the top press on the bobbin to keep it from unwinding too fast.

After weaving, the ribbons are inspected, calendered, cut up in desired lengths, and then put up for the market, being first wound on pasteboard, then packed in little boxes, wrapped in paper, and these packed in larger boxes, ticketed, and shipped.

The ribbon looms at Barmen are partly run by steam and partly by electric power. Some are operated by direct-connected motors.

The speed of the loom varies widely according to the width of loom, the number of ribbons being made, the number of shuttles, the fineness of the yarn, the pattern, etc., and may be from 80 to 200 picks a minute. For ordinary ribbons using Jacquard attachment the speed many be given as 120 picks per minute.

There is a machine for gluing together warp threads for making what is called "baft ribbons." These ribbons are used in place of twine for tying purposes, and as artificial bast or straw for making hats, etc.

YARN TWISTING AND NUMBERING—WEAVERS' WAGES.

The cotton yarn used is numbered the same as the English, though the French half metric system is occasionally used. It is interesting to note that the terms "right-hand twist" and "left-hand twist" mean in Germany exactly opposite to what they do in the United States. In the United States "right-hand" yarn is yarn of which the twist slopes up to the right similar to the threads of an ordinary right-hand screw. Germans call this "left-hand" yarn for the reason that if held in the hand it has to be twisted to the left to twist it together, whereas twisting to the right unwinds it.

Considerable lustered or iron yarn is used in weaving hat forms, etc., and the export of these forms to the United States is a big indus-

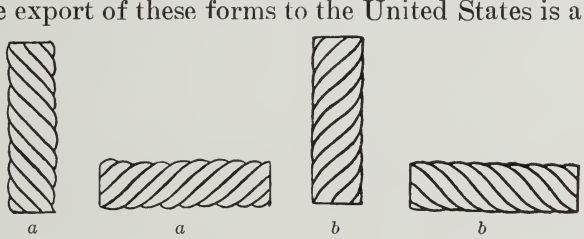


FIG. 17.—*a*, *a*, German right-hand twist; *b*, *b*, American right-hand twist.

try. There are separate factories at Barmen, Blankenstein, Breyell, Crefeld, and Langerfeld for making this iron yarn. The yarn is heavily sized and glazed and thereby becomes heavier and harder, but the length remains the same. This iron yarn is reckoned differently from the English numbering, which is usually employed for cotton yarns in Germany, as a hank is taken as 275 meters (300 yards).

For numbering the metal threads of gold, silver, copper, aluminum, etc., which are usually wrapped around a central thread of flax or cotton, there does not seem to be any fixed rule. For 50/2 gold thread there are 10,000 meters to the kilo and for 70/3 gold thread there are 10,500 meters to the kilo. The india rubber employed for interweaving with cotton and silk to make garters and other elastics comes in hanks of 66 yards to the bundle. The number of these elastic threads is based on the thickness of the cross section—that is, the number that can be laid side by side in an English inch.

Wages in Barmen and the surrounding section are higher than in most other textile centers of Germany. Ordinary weavers will average 60 to 80 cents a day and weavers on special work will get as high as $1.43 a day or more.

COST OF MANUFACTURING RIBBONS.

The following condensed translation is taken from a handbook recently issued by Prof. Otto Both, of the Prussian Textile High School, at Barmen, and is reproduced here because it serves very well to illustrate the method of figuring used by the German manufacturers in getting at the cost of manufacture of a special ribbon and also shows how they have to shift their calculations between yards, meters (meter=39.37 inches), pounds, and kilos (kilo=2.2 pounds):

We will figure on the cost of making a thousand meters of a fancy ribbon made up of colored cotton, dyed cotton, and dyed silk thread, using white cotton filling. There will be required three warps, the first with 16 ends of No. 100/2s (English numbering) colored cotton yarn, the second with 84 ends No. 60/2s (English numbering) white cotton yarn, and the third with 40 ends No. 46/48 (International numbering) China organzin colored silk thread. For filling we will use No. 50s single (English numbering). The pattern is such that to make 1,000 meters finished ribbon there will be required 1,100 meters of the 16-thread warp, 1,120 meters of the 84-thread warp, and 1,050 meters of the 40-thread silk warp. To these lengths we will add 5 per cent to cover the waste in spooling, warping, etc.

We will first find the weight of the materials to be used: First warp, 16×1,100=17,600+5 per cent=18,480 meters. 100/2 ply is the same as 50s single in weight, and a hank is 768 meters (837 yards), so we have for the weight of this warp 0.48 pound, or 0.218 kilo.

Second warp, 84×1,120=94,080+5 per cent=98,784 meters. This divided by 30×768 gives the weight of the second warp as 4.29 pounds, or 1.946 kilos.

Third warp, 40×1,050=42,000+5 per cent=44,100 meters 46/48 silk yarn. As this is International numbering, we divide 44,100 by 10,000 and have the weight as 4.41×47 grams=207 grams.

Filling.—The length of filling required can only be ascertained by actual trial. In this case for 1,000 meters of finished ribbon there is required 112,000 meters of filling, and to this we will add 4 per cent for waste allowance, so that the actual length of filling needed will be 116,480 meters. The number is 50s English single, so the weight will be 116,480 divided by 50×768, or 3.03 pounds, which is 1.374 kilos.

Part of the yarn has to be dyed and another part bleached, and then the filling wound on bobbins and the warp spooled and warped. To obtain the costs per pound of the materials ready for the looms, we will figure as follows:

Description.	Marks.	Description.	Marks.
One pound 100/2s in the gray	3.20	One kilo No. 46 China organzin silk	38.00
Dyeing per pound (90 pfennigs per kilo)	.405	Dyeing per kilo	3.50
Spooling per pound (50 pfennigs per 100 hanks)	.25	Spooling per kilo	2.00
Total	3.86	Total	43.50
One pound 60/2s in the gray	1.80	One pound filling No. 50s water in the gray	2.80
Bleaching per pound (1 mark per 10-pound bundle	.10	Bleaching per pound	.10
Spooling per pound (60 pfennigs per 100 hanks)	.18	Spooling per pound (60 pfennigs per 100 hanks)	.30
Total	2.08	Total	3.20

When the warping is made up, as in this case, of different yarns the warping is usually based on the 10,000 meters, the price ranging from 5 to 10 pfennigs. In the present case we are charged 7½ pfennigs per 10,000 ends of the cotton ply yarns, and 6 pfennigs per 10,000 ends of the silk yarn. The first warp has 16×1,100, or 17,600 meters length, and the second 84×1,120, or 94,080 meters, making a total length of cotton ply yarn of 111,680 meters, which, at 7½ pfennigs per 10,000 meters, is 84 pfennigs (20 cents). The silk yarn has a length of 40×1,050, or 42,000 meters, which, at 6 pfennigs per 10,000 meter, is 25 pfennigs (5.95 cents), making the total cost of warping the three warps 1.09 marks (26 cents).

WEAVING AND PLACING ON MARKET.

The next process is weaving. We will calculate on 400 picks per 10 centimeters (a little over 100 picks to the inch), and that the loom runs 120 picks to the minute and makes 64 ribbons at the same time. In ten working hours the loom will make 120×60×10, or 72,000 picks, and allowing 25 per cent for loss of time by stoppage the daily production will be 54,000 picks; dividing this by 4,000 picks to the meter gives 13.5 meters per division per day or, say, 80 meters a week and 64×80, or 5,120 meters, of ribbon to the loom per week. If we give the work out to a "meisterlohn" (a man who owns a few looms and does weaving by contract when the material is supplied), he will figure on a charge of 60 marks ($14.28) per loom per week, and guarantee the 75 per cent production above. The cost of weaving the 1,000 meters we desire will be about 12 marks ($2.856).

Next, we have the cost of knotting the fringes, if there are any, the calendering and cutting up, inspecting, etc., which we can figure on as 2 marks (47.6 cents) per 1,000 meters.

Next comes the cost of putting up for market, the reeling on cardboard, packing in paper, ticketing, etc.; 12 meters are put into each small box and ticketed, and one dozen of these wrapped in paper, ticketed, and put in larger pasteboard boxes. Figuring on 10 of these boxes, or 1,440 meters, we find the costs of putting up, etc. to be about as follows:

Description.	Marks.	Description.	Marks.
100 dozen reels at 6 pfennigs a dozen (reeling wages)	6.00	Paper, 4 dozen to one sheet, costing 5 pfennigs	1.25
1,200 small tickets, 100 packets, at 50 pfennigs	6.00	Binding thread, half kilo per dozen	.34
100 dozen, binding and folding up (workers' wages)	1.50	100 tickets	.25
		Total	15.34

This was for 1,400 meters; so for 1,000 meters the cost would be 10.65 marks ($2.535). In this case, as we are figuring on the work being given out for weaving, we do not have to consider cost of power, etc., but for the general company expenses we will allow 7½ per cent. The manufacturing costs of this 1,000 meters (1,090 yards) of ribbon will be found to be as follows:

Description.	Marks.	Description.	Marks.
Cost first warp, 0.48 pound, at 3.86 marks per pound	1.85	Weaving cost	12.00
Cost second warp, 4.29 pounds, at 2.08 marks per pound	8.92	Finishing costs	2.00
Cost third warp, 0.207 kilo, at 43.50 marks a kilo	9.00	Costs of putting up for market	10.65
Warping	1.09		55.21
Cost filling, 3.03 pounds, at 3.20 marks per pound	9.70	Company costs, 7½ per cent	4.14
		Total	59.35

This shows a total of $14.12, or 1.41 cents a meter. In selling there will be given a 4 per cent cash discount, and the selling agent will charge 5 per cent commission, so to the above 59.35 marks there will have to be added 9 per cent, making the gross cost price 64.69 marks ($15.40).

To the above should be added the manufacturers' profit, which will vary according to the demand and the competition, and if it is sold to a foreign country there will need to be considered the transportation costs and the duty. The above, however, gives an idea of the method of figuring employed and the comparative costs.

[Many pictures illustrating the machinery described in the foregoing report, as well as German ribbons, may be seen at the Bureau of Manufactures.]

KNIT GOODS MANUFACTURE.

CONCENTRATION, GROWTH, AND PRESENT IMPORTANCE OF THE INDUSTRY—KNITTING MACHINES AND PRODUCTS.

While the manufacture of knit goods is a larger industry in the United States than in Germany, in 1905 the United States bought from Germany knit goods to the value of $5,945,807, and this was increased to $7,267,617 in 1906, and to $8,384,830 in 1907. About 90 per cent of the knit goods bought abroad by the United States in 1907 came from Germany.

The knit-goods industry is one of the most important branches of German cotton manufacturing, and the export trade in this line is very large. The United States is the best customer, especially for hosiery, and takes large quantities, though owing to the great increase of knitting in the United States and to the growing demand from other sections of the world the proportion taken by the United States is less than formerly.

The bulk of the German knit goods is made in and around Chemnitz, but Limbach has also become an important center for knitted underwear, Thallmein for gloves, Apolda in Thuringia for shawls, caps, and general knitted goods, while other smaller places are centers for certain special lines.

EARLY CONCENTRATION OF THE INDUSTRY AT CHEMNITZ.

The golden years of the Chemnitz knit-goods industry was the period before the expiration of the patent on the knitting goods machine invented by Cotton. Favored at that time by the quick growth in the use of knit goods abroad, especially in North America, the rapid perfecting of means of communication, and the active development of great export houses in Chemnitz, and aided by the passing of certain competitive districts abroad, especially those in England, Chemnitz and the neighboring towns in the valleys of the Uskaberger Mountains became active in this industry and developed it at a rapid pace.

Even before this, the fact that the manipulation of the old machines required a slow apprenticeship from youth, together with the natural disinclination of Saxons to wander, had a tendency to concentrate and retain the industry in one place. The machine invented by Cotton tended to the erection of large factories and still more centralization, because its costliness, its heavy requirements for power, and its difficult manipulation rendered it unsuited for small users. Its introduction marked the start of the great central factories in Chemnitz. The protection given by patent rights, and the continually increasing market abroad, enabled Chemnitz to perfect the organization of the working force in these big factories and tended still more to give them the undisputed leadership in this line.

GROWTH OF COMPETITION AT HOME AND ABROAD.

Since the expiration of the Cotton patent, in 1883, new competitors have arisen, especially in the United States, and Chemnitz no longer enjoys the complete supremacy formerly accorded it. The manufacturers of knit goods in other countries quickly availed themselves of the coveted rights, and were aided by the German makers of knitting machines, who, anxious for a market for their increasing production, were ready to sell to any country and to give any terms required. A reduction in wages at Chemnitz at this time, brought about by the breaking down of the knitting monopoly there, also tended to scatter the workers abroad and to give their competitors the skilled operatives of whom they were in need. There has, therefore, been increasing competition both at home and abroad, and profits have become much reduced.

With all these difficulties, however, and in spite of the fact that wages are rising, the industry is a prosperous and a growing one, and with the aid of their cheaply paid but highly skilled workmen operating the most improved machines they are able to compete with foreign factories in their home markets, notwithstanding high tariff rates.

FOREIGN MARKETS, TRADE METHODS, AND TERMS OF SALE.

At Chemnitz hosiery is the great specialty, and after that knitted gloves and underwear. According to the president of the Wirkwaren Fabrikante Vereinigung von Chemnitz und Umgegend, about 50 per cent of the Chemnitz output of hosiery finds a market in the United States, though this is a smaller proportion of the total than in former times. At present this dependence on the American market has resulted in a large number of the factories running short time or closing down, due to the financial conditions in that country.

In knitted gloves England is Germany's best customer, with the United States second. The underwear made at Chemnitz is mainly for home use, but considerable amounts are taken by neighboring nations of the Continent, and smaller amounts sent to England and the United States. The Germans cater to the particular requirements of each country, each class of goods being especially made for the market in which it is to be sold, and the fact that they do so, and recognize that goods made for Germany could not be sold in the United States, and that goods made for England could not be sold in Italy, has much to do with their success as exporters.

In selling hosiery and other knit goods the usual terms are for cash, less 4 or 5 per cent discount. The manufacturers sell direct to large commission houses at Chemnitz and to buyers established there or to traveling buyers. There are 88 American houses represented at Chemnitz. The larger of these pay cash, and others give bills of exchange on London. A few buy on open account and a few remit money on receipt of goods.

STYLES OF HOSIERY KNITTING MACHINES IN USE.

The makers of knitting machines at times make larger profits than do the knit-goods manufacturers, but their business is subject also to fluctuations. A number of Chemnitz knitting machines are sold to manufacturers in the United States. The prices of such machines vary, but the present price on a 16-division Cotton machine is 7,000

marks ($1,666). Such a machine will make 12 dozens of ladies' hose or 26 dozens of socks in ten and one-half hours, running 50 to 60 courses per minute for plain fabrics. For striped fabrics the speed will be reduced to 40 to 46 courses per minute.

There are two principal systems employed in making hosiery, the "full-fashioned" and the "seamless." In the full-fashioned the body of the stocking is knitted out flat on a machine which makes a dozen or more at a time, and then these are sewed together. The seamless stockings are made on a circular knitting frame. The first system is most used in Germany and the second in the United States. The curves can be better obtained by the first system, and the cost of operation is usually cheaper, but a seam is left where the parts are joined together.

At first hosiery was made at Chemnitz on hand machines, and these are still used in the more remote sections of Saxony. Then there were used small Paget frames, and now there are used the Cotton frames, making 12 to 24 stockings at a time. On most grades the managers have found by experience that a 20-stocking machine is the widest that a workman can manage efficiently, and on specialties this number has to be much reduced.

Formerly the demand was for heavy goods, but to-day light hosiery and underwear sell the best, while mercerized and fancy effects are very popular. In knitted gloves the demand is for longer styles.

YARN SUPPLY AND SYSTEMS OF NUMBERING.

Hosiery is made mostly from yarns ranging from 10s to 32s, but some is used up to 100s, and even in smaller amounts up to 200s. The majority is single, but some is doubled. For knit goods in general 18s to 60s single cops are used. A large amount of Egyptian yarn is employed in this trade. The yarns required are mainly furnished by Saxony, but there is a large amount bought from England and smaller amounts from Bavaria, Bohemia, and other sections. Vigogne and imitation vigogne yarn, made of cotton and wool or wool waste or made of cotton and cotton waste, is used in cheap underwear and to some extent in stockings.

In buying and figuring on cotton yarns at Chemnitz the numbering is almost entirely by the English system of the number of 840-yard (768 meters) hanks contained in a pound. To a much smaller extent there is used the metric or decimal system of numbering, according to the number of hanks of 1,000 meters contained in 1,000 grams. In worsted yarn there are used two systems of numbering, the German, which makes the worsted hank the same as the cotton hank of 768 meters, or 840 yards, and the English system, which gives a worsted hank a length of only 560 yards, so that in buying worsted yarns the Saxon manufacturer always specifies whether long or short reel. For woolen yarns the same numbering as for short hanks in worsteds is generally used. A German authority says that as woolen yarns require about 15 per cent of oil in spinning, and worsteds as spun in England a very small quantity, when the former is wound it is from 12 to 15 per cent finer than the latter, the sizes being always calculated from the weight of the yarn in oil.

MEANING OF "GAGE" AS APPLIED TO MACHINES.

Knitting machines are usually designated according to the "gage," but this term has a different meaning in England, in France, and

in Germany. The knitting needles—that is, the frame or hooked needles—are fastened in "leads" made of a mixture of lead and tin, usually two needles to a lead.

In England the gage or fineness of a frame signifies the number of leads, each containing two needles, which lie in a space of 3 inches. A No. 24 gage machine therefore has 2 times 24 or 48 needles to 3 inches, which is 16 needles to the English inch.

In France they first used the same system based on 3 of the old Paris inches, but they now use two gages, "gros" and "fin," based on 3 French inches, a French inch being one thirty-sixth of a meter (1 meter=39.37 inches). This French inch has come into use because of the inconvenience of the decimal numbering of the meter for divisions into twelfths, etc. The "jauge gros" is used for gage numbers up to 27s, and the "jauge fin" for gage numbers from 20 up, the first meaning the number of two-needle leads in a distance of 3 French inches, and the latter the number of three-needle leads in a distance of 3 French inches.

In Germany they sometimes use the French system of numbering, which is due to the fact that knitting was first introduced from France, and some factories use the English system, but owing to the inconvenience of both the majority of the Saxon machines are now based on a gage which is the number of needles to a Saxon inch, which is a more direct and simple method than either of the others. Thus 24-gage Saxon means 24 needles to the Saxon inch.

The French inch is equal to 1.0936 English inches, and the Saxon inch is equal to 0.9291 of an English inch, so No. 24 gage would mean, according to the various systems, the following number of needles to an English inch: English, 16; French gros, 14.63; French fin, 21.95; Saxon, 25.83.

In Saxony the gages run from 24 to 51, the machines in common use having gages (Saxon) of 30, 33, 36, or 39. In England the gages (English) in common use are 24 and 27.

FACTORY OWNERSHIP, EMPLOYEES, HOURS, AND WAGES.

The Saxon knitting factories are all private concerns, with the exception of one joint stock company, which is English owned. The managers say that this is due to the fact that knitting is a specialized industry, and that in these days of close competition it is necessary to have a man at the head who is vitally interested in the success of the business and untrammeled by any outside authority. It may also be a factor that stock companies have to publish in newspapers accounts of their standing while private companies do not. The capital in a knit-goods business is not as important as is the management.

Some factories at Chemnitz pay employees weekly and others fortnightly; usually one week's wages are held back. The hours of work are either 61, 60, or 59, more commonly the last, and the factory runs from 7 to 12 o'clock, with fifteen minutes intermission, and from 1 to 6.30 o'clock, with fifteen minutes intermission. They do not usually close on Saturday afternoons, but stop work one hour earlier.

Wages in the knit-goods business in Saxony, while low as compared with other sections, are increasing, and owing to the great demand for female labor the wages of the women are rising more in proportion than those of the men. In the knit-glove industry there has been an advance in most places of from 60 to 100 per cent in the last two years alone. At the present time wages are again lowered, but

this is temporary, due to the financial depression, and as the cost of foodstuffs is continually advancing labor costs will become more and more a factor to be considered by the Saxon knitter, in spite of the fact that the dense population of Saxony—the densest in Europe—has heretofore given them an advantage over any of their competitors. Their labor is at present, and will probably continue to be, even with advances in the future, cheaper than that of their rivals in Troyes, France, and Nottingham, England.

DIVERSIFIED CONDITIONS AFFECT WAGE SCHEDULES.

Labor unions in Saxony have endeavored to fix uniform schedules of wages for the different classes of work in the knit-goods industry, and in this they have had the good will of some of the manufacturers, but owing to the different makes, sizes, and speeds of the machines, varying the production of each worker, and also to the many variations in the methods of work and to the great number of special varieties of goods made, it has been found thus far too difficult to generalize. There is, therefore, not the slightest uniformity in regard to the wages paid, each manufacturer getting his help as cheaply as he can, and every time he introduces a slight variation or starts on some new specialty there is a period of seesawing until the remuneration to be paid is steadied temporarily.

Between two factories working side by side on the same general class of goods there is frequently to be found a wide variation in wages paid, according to whether the machines used are old or new, the size and speed of the machines, the popularity of the manager, and the privileges he accords workers, etc. Various managers of whom I inquired as to average prices paid said that they knew their own prices and that of a few of their competitors, but that they had but a vague idea as to what could be considered average wages for the various classes of goods.

To show the variations in wages and the minuteness with which such wages have to be adjusted, even in one factory running on a limited variety, I have obtained the following prices now being paid in a hosiery factory where the operations were as follows: Spooling yarn, knitting leg, running on foot, knitting foot, heeling and toeing, seaming, and mending. The dyeing and finishing are done outside. The prices are all given in pfennigs, owing to the difficulty of giving the equivalents in cents without too many decimals. To change pfennigs into cents, multiply by 0.238.

SPOOLING.

[Wages in pfennigs, per pound English.]

Yarn numbers (English)	8–15	16–20	21–30	31–40	41–50	51–60	61–70	71–80	81–90	98	112
Cotton cops:											
Spooler	2	2¼	2¼	2½	2¾	3¼	3½	3¾	4¼	.....	.....
Rewinder	1½	1¾	2	2¼	2½	2¾	3	3¼	3½	.....	.....
On patent winder	2½	3	.....	.....	.....	.....	.....	.....	.....	.....	.....
Wool cops:											
Spooler	1¾	2	2	2¼	2½	3	3½	4	5½	8	12
Rewinder	1¼	1½	1¾	2	2¼	2½	2¾	3	3¼		
On patent winder	.....	.....	3	3½	.....	.....	.....	.....	.....	.....	.....
Skein yarn, spooler on:											
Single gray cotton	3½	5	6¾	7½	9	10½	11½	13	.....	.....	.....
Two-ply gray cotton	2½	3½	4½	5½	6	7	8	9	.....	.....	.....
Single colored cotton	10	12	14	16	28	30	32	34	36	.....	.....
Two-ply colored cotton	4½	5½	6½	7½	8½	9½	10½	11½	.....	.....	.....
Single colored wool	.....	10	17	19	21	.....	.....	.....	.....	.....	.....
Two-ply colored wool	7	8	9	10	11	12	13	14	.....	.....	.....
Skein yarn, rewinder on:											
Single colored cotton	2½	3½	4	5	5½	6	6½	7	.....	.....	.....
Two-ply colored cotton	1¼	1½	2½	3½	4	4½	5	5½	.....	.....	.....
Single colored wool	.....	2½	3	4	5	6	7	.....	.....	.....	.....
Two-ply colored wool	.....	.....	1½	2½	3½	4	4½	.....	.....	.....	.....

Thread numbers	2/35	2/40	2/50	2/60	2/70	2/75	2/80	2/85	2/90	2/100	2/140
Thread:											
Spooling gray skein thread	7	8	9	10	13	16	18	20	21	23	27
Spooling colored skein thread	11	12	13	14	25	27	29	30	32	35	43
Rewinding gray thread onto cheeses	1¼	1½	2	2½	3	3¼	3½	3¾	4	4½	5½
Rewinding colored thread	3	3½	4	4½	4½	4¾	5	5¼	5½	6	7
Rewinding lisle skeins onto cheeses	.....	8½	9½	10½	11½	12½	12½	13	13½	14½	16½
Spooling silk	.....	.....	12	13	14	.....	15	.....	16	17	18

LEG MACHINE.

[Wages in pfennigs, per dozen pairs.]

Gage	30		33			36				39			42	48	2/1 rib.	1/1 rib
Divisions	8	12	12	16	18	8	12	16	18	8	12	18	8	12	12	12
Women's gray cotton hose:																
With extra loose instep	55	37	45	37	32	76	56	45	40	95	73	55	137	65	70	
Extra close knit	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	
Children's hose, all sizes less than women's	.....	5	5	.....	.....	.....	5	.....	.....	10	.....	.....	.....	10	10	
Short-leg stockings	10	5	5	5	5	10	5	5	5	10	5	.....	.....	5	5	
Extra for long tops:																
In cotton	.....	8	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	
In wool	.....	9	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	
In lisle thread	.....	10	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	
With knee cap	.....	3	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	
Gray and natural wool and gray thread over cotton lache	5	5	5	4	4	5	5	4	4	5	5	4	10	5	5	
Extra compensation for very fine numbers	5	5	5	5	5	5	5	5	5	10	10	.....	50	10	10	
Clerical wool and colored feet and rows, extra	12	12	12	12	12	12	12	12	12	12	12	12	80	12	12	
Extra marking:																
When with striped apparatus	3	3	3	3	3	3	3	3	3	3	3	3	3	.....	.....	
Without apparatus	3	3	3	3	3	3	3	3	3	3	3	3	3	.....	.....	
Heel and toe cap of wool and colored, extra	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	
Under two dozen, extra	20	20	20	20	20	20	20	20	20	20	20	20	20	.....	.....	
Two dozen or more	15	15	15	15	15	15	15	15	15	15	15	15	15	.....	.....	
Kneecap, extra	.....	5	5	.....	.....	.....	5	5	.....	5	.....	.....	.....	.....	.....	
Reenforced seam, extra	.....	.....	4	3	3	4	4	3	3	4	4	3	4	.....	.....	
15 to 1 drop stitch, extra	25	25	25	25	25	25	25	25	25	25	25	25	25	.....	.....	
Group drop stitch, extra	40	40	40	40	40	40	40	40	40	40	40	40	40	.....	.....	
Extra wide	.....	.....	.....	.....	.....	10	10	10	10	10	10	10	10	.....	.....	
Opera lengths	.....	.....	.....	.....	.....	.....	.....	20	20	20	20	20	20	.....	.....	
Size marks with the hand, per row extra	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
Lot of 4 dozen or less, extra	10	10	10	10	10	10	10	10	10	10	10	10	10	5	5	

RUNNING ON FRENCH FOOT.

[Wages in pfennigs, per dozen pairs.]

Gage	30	33	36	36	36	39	48
Divisions	12	12	12	16	18	18	8
Gray, cotton foot:							
8 to 12 inches	10	11	12	15½	15½	16	50
4 to 7½ inches or less	1	.....	.....	.....	.....	.....	.....
Gray and natural wool and gray thread over cotton	2	2	2	2	2	2	4
Woven with merino, extra	1	1	1	1	1	1	1
Clerical wool (dark-gray mixture) and colored over gray	2	2	2	2	2	2	11
Woven with split, extra	2	2	2	2	2	2	.....
Striped over plain	2	2	2	2	2	2	.....
Woven with drop stitch, extra	2	2	2	2	2	2	.....

FRENCH FOOT MAKER.

[Wages in pfennigs, per dozen pairs.]

Gage	30	33	36	36	36	39	48
Divisions	12	12	12	16	18	18	8
Gray cotton sock, foot 9 to 12 inches	22	24	27	18	16	18	23
Gray cotton, woman's, foot 8 to 10¼ inches	18	20	23	14	12	14	23
Gray cotton, child's, foot 4 to 9 inches:							
With 1 assistant	15	19	20	.....	.....	.....	.....
With 2 assistants	.....	16	.....	.....	.....	.....	.....
Foot with long border, extra, with 1 assistant	.....	7	7	.....	.....	.....	.....
Gray and natural wool and gray thread over cotton	2	2	2	2	2	2	9
39-gage to 36-gage goods, extra	.....	.....	2	2	2	.....	.....
Extra compensation for very fine numbers	.....	.....	10	6	5	.....	.....
Clerical wool and colored, extra	4	4	4	3	3	3	13
1/30 and 1/36 clerical wool, extra	.....	5	.....	.....	.....	.....	.....
Heel and toe cap from wool and colored, extra	3	3	3	3	3	3	.....
Striped over plain	10	10	10	.....	.....	.....	.....
Half sole, extra	3	3	3	2	2	2	3
Split sole, including heel and toe cap, extra	6	6	6	6	6	6	.....
15 by 1 drop stitch, extra	8	8	8	.....	.....	.....	.....
Group drop stitches, over plain	16	16	16	.....	.....	.....	.....
Size marks, extra	1	1	1	1	1	1	1
Lot of four dozen or less, extra	5	5	5	5	5	5	.....

HEELER.

[Wages in pfennigs, per dozen pairs.]

Gage	24	30	33	36	39	42	48	Ribbed. 2/1	Ribbed. 2/1
Heel and toe, either gray or white	8½	9½	10	11½	13	14	18	7	7
Silk thread over gray	.....	.....	1	1	1	1	.....	.....	.....
Colored over gray, also gray with colored toe	4	4	4	4	4	4	4	4	4

SEAMING.

[Wages in pfennigs, per dozen pairs.]

Gage	30	33	36	39	42	48
Gray cotton and stocking thread:						
French foot, 00–0	10½	11½	12½	13½	.....	.....
French foot, 1–2	12½	13½	14½	15½	.....	.....
French foot, 3–4	14	15	16	17	.....	.....
French foot, 5–6	15	16	17	18	.....	.....
8–10 inches	17	18	19	20	.....	30
Silk thread over gray	1	1	1	1	.....	1
Wool thread over gray	2	2	2	2	.....	2
Colored thread over gray	6½	6½	6½	6½	.....	6½
Goods with heel and toe cap, extra	2	2	2	2	.....	2
Striped over plain	5	5	5	5	.....	5
Opera lengths long knitted stockings	5	5	5	5	.....	5
Gray cotton and loose thread:						
French foot, 4½–5½ inches	9	10	11	.....	.....	.....
French foot, 6–7 inches	10	11	12	.....	.....	.....
French foot, 7½–8½ inches	11	12	13	.....	.....	.....
French foot, 9–12 inches	11	12	13	14	.....	19
Wool over gray	1	1	1	1	.....	1
Colored over gray	2	2	2	2	.....	2
Goods with heel and toe, extra	2	2	2	2	.....	2
Striped over plain	3	3	3	3	.....	3

Some of the Saxon knit-goods manufacturers are very advanced in their plans for ameliorating the condition of their help, and besides giving the boys time off to attend technical instruction, as required by law, they also have courses of instruction for the girls and women in household duties, including cooking and sewing classes, and besides night classes some factories give the girls a few hours off each week to attend such classes in the daytime, the teachers also being paid by the factory. Most of the factories provide a lunch room, with tables and chairs, where the employees can eat their lunch, and many furnish food at cost in such places.

[Several photographs showing a typical Chemnitz knitting mill, groups of operatives, and some of the hosiery machines used accompanied Mr. Clark's report and are on file in the Bureau of Manufactures.]

REPORTS FROM CONSULAR OFFICERS.

AIX LA CHAPELLE.

WAGES, FOOD PRICES, LIVING CONDITIONS, OPERATIVES AND MACHINERY.

Consul Pendleton King furnishes the following information relative to the textile industry of Aix la Chapelle, in Rhenish Prussia:

There are many different kinds of cloth-making machinery used in this district, some of them peculiar to the district; the old kinds have mostly been replaced, within the last five years, by improved machines of Saxon, Belgian, English, and French patterns. Wool-washing machines, called here leviathans, came formerly mostly from Belgium, but now come mostly from Saxony.

Combing machinery is from Muelheim-am-Rhein and Manchester. The older carding machinery is of local, Belgian, French, or English manufacture, but the improved kinds are of Belgian and German (Saxony) manufacture. The older mule-jennies are of Belgian and English manufacture, but they are being mostly replaced by automatic Saxon machines.

The worsted yarn mills mostly have crempel and carding machinery of Belgian manufacture. Leather and cotton wire cards and crempel machines are of Aix la Chapelle manufacture.

Spinning machines (excepting some old machinery of local, English, and Belgian factories) are now of the newest improved types, a large proportion of which are made in Germany and England. A new kind introduced in this district within a few years is the pipe-spinning machinery, the so-called "metiers" of Belgian manufacture.

Gluing, spooling, and warp making and drying machinery are used of various makes, some Belgian and some German; the newest kinds are from Silesia and Saxony. A great variety of looms, mostly of the Jacquard harness or cardboard type, of English, French, Belgian, Swiss, and local make, some of them over twenty years old, are used in this district.

SPEED OF MACHINES—OPERATIVES PER MACHINE.

Slow looms of 50 to 105 shuttle movements a minute, most of them having a speed of 80 to 105, are used, but they are being gradually replaced by the highly perfected mechanical looms of Saxony. More than 40 per cent of all the looms bought in the last three years were of Saxony manufacture. These Saxon looms are of an improved Jacquard type, with harness or pasteboard cards, and a perfected contrivance for lifting and depressing the warp for the passage of the shuttle and drawing the threads; they are heavy high-speed machines, making between 150 and 180 shuttle movements a minute, and are mostly sold on the installment plan; 15 per cent is generally paid on delivery, and the rest in yearly installments of 20 per cent. Such high-speed looms

are sold in this district, mounted and set in motion, at from $200 to $300 each.

Besides the looms mentioned, Belgian and English looms are running in this district.

Cloth shearing, bleaching, dyeing apparatus, and stretching machines are all of German manufacture. Fulling machines and carding machines are the product of Aix la Chapelle. Bobbins, spindles, and shuttles are of German manufacture, but some of Dutch manufacture are also in use.

No machines for woolen cloth are in use here where one operative tends more than one loom. The introduction in one mill, some two years ago, of the two-loom system (i. e., one operative tending two looms) met such opposition from the Weavers' Union that the manufacturer stopped using them.

WAGES AND LIVING CONDITIONS OF OPERATIVES.

The wages in the Aix la Chapelle woolen mills are as follows: The foreman of the spinning department (spinning master) from $9 to $14, the operatives from $5 to $6, and the other help, mostly girls, from $4.50 to $5 per week.

The foreman of the weaving department (weaving master) from $9 to $14, and the regulators or setters from $7 to $10.50 per week. Weavers are paid $5 to $9 per piece, and if capable and diligent can finish 1½ pieces of 40 meters (43.6 yards) at $5 or 1 piece at $9 each week. They earn, on an average, from $1 to $1.40 per day.

The darning of pieces is done by women and girls. The mistress of the darning department receives from $8 to $10 and her assistants from $5 to $7 per week.

The working hours are somewhat variable; generally they run from 7 a. m. to 12, and from 1.30 to 7 p. m.; married women or girls with families are generally allowed to quit work at 6.30.

More than 25 per cent of the factory operatives of Aix la Chapelle have their homes in Holland, whence they come each morning (some as far as 30 miles) and return each evening. For this they pay 75 cents a week for the "workmen's railroad ticket." They mostly own little houses with ¼ to 1 acre of garden or field. They have a cow and a few pigs or keep some goats, and bake their own bread. They are allowed a few days off each year to till their fields. They manage to live very cheaply; a family of father, mother, and four children will live on 60 cents a day. Flour is 20 per cent and meat 25 per cent cheaper in Holland than in Aix la Chapelle. Most of those country home dwellers have a savings bank account or deposit of a few hundred dollars. They are an honest, economical people, and the most reliable of the factory operatives. Much the same may be said of a further 15 per cent of the operatives, who live in German villages around the industrial cities of this district. These also mostly own little houses and fields, or pay $12 to $14 rent per year for such. They are generally able to take to farming occupations when factory work becomes scarce.

The life of the textile workmen dwelling in the city is not so favorable. The cost of living is very high in this city and in towns of this consular district.

In this city (the principal center of the cloth industry of the district) one-fourth to one-fifth of the wages of a weaver is needed for rent; a family generally pays for two rooms $4 to $6 a month.

COST OF LIVING.

The retail prices of foodstuffs and other necessaries of life in Aix la Chapelle are as follows:

Description.	Per pound.	Description.	Per pound.
Foodstuffs:	*Cents.*	Foodstuffs—Continued.	*Cents.*
Beefsteak	27 to 30	Butter	10 to 12
Other parts of beef	20 to 25	Cream butter	35 to 40
Ham	40 to 55	Eggs—	
Sausage	10 to 30	In winter	24 to 42
Pork	20 to 25	In summer	24
Horse meat, used by many workmen's families	10 to 12	Black rye bread, of coarse, crushed rye and refuse flour, 4-pound loaf	12 to 14
Flour—		White bread—1-pound loaf	4 to 6
Prime	5 to 6	Milk—per quart	5 to 10
Second quality	4 to 5	Other necessaries of life:	
Third quality	3 to 4	Coal—per 100 pounds	40 to 55
Potatoes	1 to 2	Kindling wood—do	45 to 55
Dried Bosnian prunes	6 to 8	Workmen's shoes, heavy nailed, per pair	125 to 225
California prunes	15 to 18	Workmen's labor suit, blue Nankin	150 to 200
Cheese—		Ready-made suit, of artificial wool or threaded	300 to 800
From skimmed milk and the refuse from margarine butter	10 to 12		
Best cheese	26 to 30		

While milk costs from 5 to 10 cents per quart, it is furnished free to the families of workingmen who have several children, and for less than half price to others whose ability to pay is limited, on a certificate of the family physician stating the circumstances.

The children of workingmen are also taken out once a week during the summer by their teachers, and are then given bread and milk free of charge. The workingmen of the better class generally belong to a singing or other club, and many of them raise pigeons, rabbits, etc.

There is also a benevolent institution where the wives of workingmen, at times of confinement, can remain three weeks, for from $3 to $5. Children from 2 to 6 years old can go to a kindergarten during the day until the mothers return from the mills. There is also provision made for the industrial education, in industrial schools, of children of workingmen whose means may be limited.

Upon the whole, the children of the workingmen do not present a bad appearance; they are not poorly clothed, and look healthy. [Samples of cloth manufactured in Aix la Chapelle, which accompanied Consul King's report, are on file for inspection in the Bureau of Manufactures.]

BAMBERG.

INDUSTRIAL ACTIVITY IN COTTON MILLS—WORKMEN'S HOMES.

Consul William Bardel states that there are about 20 cotton mills in the Bamberg consular district, the largest giving employment to 1,500 mechanics. He adds:

The wages paid to foremen are from $47.60 to $83.30 a month; workingmen under 16 years of age receive from $2.18 to $2.86 a week; those over 16 years old from $4.28 to $7.14 weekly. Women over 16 years old earn from $2.15 to $3.15, while those under this age receive from $1.71 to $2.15 a week. Sixty-one hours constitute a working week. The cotton mills spin thread out of American good middling. They weave shirting and sheeting muslin exclusively. The majority of the machines are tended by one operative.

The cotton-mill owners have built a number of workingmen's homes for their operatives, which they rent to them for $23.80 to $47.60 a year. Other necessary requirements cost between 31 and 48 cents a day.

BRESLAU.

OUTPUT OF THE MILLS, AND WORK AND WAGES OF THE OPERATIVES.

The following information concerning the textile mills of Silesia and the labor conditions prevailing therein is furnished by Consul Herman L. Spahr, of Breslau:

There are in Silesia about a dozen large establishments engaged in the linen industry, and quite a number of smaller mills. The average wage paid in these is as follows, per week, of ten hours per day, and running three hundred days per year: Overseers, 24 marks ($5.71); male operatives, 15 marks ($3.57); female operatives, 9 to 10 marks ($2.14 to $2.38).

The machinery used, steam engines, turbines, looms, Jacquard machines, and preparing machines, are mostly of German make, but some are of English origin. The largest weaving mill in the district makes almost exclusively figured linen goods, such as tablecloths, napkins, and towels, and table covers in white and colors, plain and embroidered.

As a rule one operative tends one machine, seldom two, as the articles manufactured require close attention. In spite of the apparently small pay, the majority of employees are able to keep up the household and save something, without even strict self-denial. Often several or all members of a family are employed in the factory, and thus the family can live well. Where there is a number of young children, living is more difficult, especially when the head of the family for any reason is incapacitated for steady work; but such cases are exceptions, and are generally ameliorated by charity.

WELFARE WORK.

In addition to the welfare provisions required by law, the following endeavors of the owners to better the condition of their operatives may be mentioned. There are savings banks paying 5 per cent, with yearly deposits of about 50,000 marks ($11,900); soup and coffee kitchens charging $3\frac{1}{3}$ pfennigs (0.8 cents) a portion; bath houses where a bath costs $3\frac{1}{3}$ pfennigs; infirmaries for free nursing and treatment; a fund for convalescent workmen, and another for the care of feeble children. Widows and aged workmen receive pensions or an extra allowance, besides the age and invalid pensions fixed by law. One mill reports that in 1907 the sum of 29,000 marks ($6,902) was set aside for dwelling improvements.

The owner of a large weaving mill reports that the workmen enter his service usually as soon as they leave school, and frequently remain through life. Many of them have been in the mill thirty or forty years. Intelligent and industrious employees are promoted from time to time. Outsiders are seldom employed, but workmen once employed are never thrown out of employment against their will, when hard times set in. Their income, if not large, is at least, to a certain degree, secure.

COTTON MILLS.

The cotton mills in Silesia number about a dozen for spinning and a score for weaving. In the former overseers get from $5.36 to $7.38 weekly; male operatives average 55 cents daily, and female operatives 48 cents. The spinners work ordinarily ten hours a day, the weavers ten and one-half hours. Children under 14 years must not be allowed to work over six hours a day, three in the morning and three in the afternoon. The machinery is principally of English and German make. The finished products include staple articles and bedding, aprons, inlets, coarse goods (flannels, etc.), also dress goods, zephyrs, etc. One operative attends to one machine, perhaps two, and in exceptional cases three. This is in the main due to the scarcity of labor, leading often to the employment of unskilled workmen. Food is usually furnished at low prices. For instance a group of five mills (one spinning, four weaving) belonging to one firm, maintains canteens, at which a meal is sold for 20 pfennigs (4.8 cents) and, at the coffee hour, one-half liter (1.3 pints) of coffee with two rolls, for 5 pfennigs (1.2 cents). Bath houses, kindergartens, and hospitals are also established. The cotton mills employ 3,200 workmen, who run 2,658 looms in the four weaving mills and 29,500 spindles in the spinning mills. [Samples of linen, cotton, and union goods made in the foregoing mills are on file in the Bureau of Manufactures.]

CHEMNITZ.

A BUSY INDUSTRIAL AND COMMERCIAL CENTER.

Consul Thomas H. Norton, writes that Chemnitz is especially well provided with technical schools for training in the various industries, and especially for the textile trade. He continues:

The cotton goods, especially stockings, for which the place is mainly celebrated, rival those of England in quality and cheapness. It is also famous for the manufacture of spinning machinery. There are numerous establishments for the weaving of woolen and half woolen cloths, and the stocking weaving is prosecuted by a large number of firms. The dye works, paint works, bleach works, and chemical works employ a great number of workmen and carry on a large trade.

Hundreds of thousand dozens of knit gloves are purchased here annually by buyers from every country in the world. In the surrounding district the ceaseless noise of the knitting machine is heard in every home. The export trade is very extensive. The principal ar-

icles of exports declared at Chemnitz for the United States during he calendar year 1906 were:

Articles.	Value.	Articles.	Value.
Underwear	$181,850	Gloves:	
Machinery	277,190	Cotton	$1,852,620
Hosiery:		Silk	668,440
Cotton	7,038,910	Wool	272,190
Silk	236,495	Other articles	658,245
Wool	61,570	Total	11,247,510

VARIETY AND VALUE OF THE OUTPUT.

The great prosperity of the hosiery trade is largely due to the good demand manifested by the United States. Lisle-thread goods, of which a dozen of ladies' stockings only weigh 1¼ pounds, are becoming largely sought. As regards fancy styles, lace openwork goods still lead in this market, and there is also a large demand for hand embroidery on hosiery. Kid gloves are largely manufactured, but this particular line has been affected by the popularity of silk and lace gloves. Golf and Scotch gloves are also a popular feature of this market. In laces the demand is good for guipures, nets, and galloons. Another important line is that of dress fabrics, such as jacquards, serges, armures, and grenats. The trade in upholstery goods, plushes, etc., is also in a flourishing condition.

Germany has almost obtained a monopoly in the cotton knit goods trade in the United States, the exports thither amounting to $6,150,484 in 1905, $7,128,897 in 1906, and $8,671,848 in 1907. The principal supply for these goods was Chemnitz. The number of spindles in Saxony has increased from 740,000 to 1,430,000 in twelve years. The total in the German Empire is now 10,000,000.

CREFELD.

WAGES GRADED ACCORDING TO SKILL OF OPERATIVES.

Consul Joseph E. Haven furnishes the following information from Crefeld:

There is no recognized wage scale in force in the silk and velvet mills in this district, each manufacturer having a standard of his own. The wages vary in the different departments, according to the skill of the several workmen. In the weaving department overseers receive from $5.95 to $7.14 a week, while laborers are paid from $5.71 to $6.18. In a few factories wages are paid according to piecework. Overseers in the winding and warping departments receive from $5.95 to $7.14 weekly; the laborers from $3.57 to $4.96. The employees in these departments are generally women. In the dyeing department overseers are paid $9.52 to $10.71, skilled labor from $7.14 to $8.33, and unskilled labor from $4.76 to $5.95. The overseers in the finishing department receive $8.33 to $9.52, and the laborers from $4.76 to $6.18.

The machinery used in the several factories is principally of German manufacture, and the classes of textiles manufactured are silks, half silks, velvets, and cotton yarn. The operatives in the larger

towns have their houses in which several families reside, while those in the country each have a cottage and usually a small plat of ground. [Samples of silks, half silk, and other textiles are filed for inspection in the Bureau of Manufactures.]

DUSSELDORF.

SPECIAL LINES OF TEXTILE INDUSTRY—GIRL APPRENTICES.

Consul Peter Lieber, writing from Düsseldorf, says that the textile industry of Germany is divided into two principal branches, spinning mills and weaving mills, comprising two special lines, those working silk and those working cotton. The consul adds:

In spinning mills, where only women are employed, the average daily wage is from 71.4 cents to 83.3 cents. Immediately after leaving school, usually at 14 years, the young girls enter the factories. In two years they earn from 35.7 cents to 47.6 cents a day, and after four or five years their wages are increased to the maximum of 83.3 cents. In weaving mills the salary undergoes many fluctuations, reaching as high as $1.19 per day. There are also many factories where workers are paid according to what they produce, and often make as much as $1.30 a day.

The weaving mills in Düsseldorf employ mostly German machines; in some cases French machines are used. In several other places American and English machines are in use, which are by no means inferior to the German machine as to their capacity and mechanical construction. [Samples of silk and other fabrics made in the Düsseldorf region are filed for inspection at the Bureau of Manufactures.]

EIBENSTOCK.

CONDITIONS AND WAGES IN THE COTTON KNIT-GOODS INDUSTRY.

Consul William C. Teichmann, of Eibenstock, reports that the most important textile industry in his district is the manufacture of cotton hosiery and underwear, with embroidered trimmings ranking second, concerning which he writes:

The knit-goods industries are located chiefly at Gornsdorf and Thalheim. At Gornsdorf twelve factories, all producing hosiery, had been doing a prosperous business until the American financial flurry of last fall and the inauguration of a protracted strike changed these conditions unfavorably. This strike revealed the wage scale, so that a description of wage conditions, otherwise difficult to obtain, can be given.

The five firms originally affected by the strike employed 472 men and 209 women workers, with weekly wages amounting to $3,351, averaging $4.92 per person a week. Of the men, 65.3 per cent earned more than $4.76; 55.6 per cent more than $5.36, and 42.9 per cent more than $5.95. Of the male employees, 154 received $6.43 and over; 80 more than $7.14, and 14 over $8.33. The highest wages paid the men ranged from $8.64 to $10.13.

The total annual wages earned by some families through their several members exceed $1,500. The normal number of hours of

work for these wages was fifty-eight per week, averaging a little less than ten hours per day. The wage scale given includes all working people, even boy and girl apprentices and operatives. On the whole, these scales are high for Saxon factory labor and are due to the rapid expansion of the Saxon textile industries in recent years, the dearth of labor for the supply of industrial demands in general in Saxony, as well as for German agricultural requirements, and the tendency of the employers to grant the steady increase in wages enforced by labor in the industries during the recent economic prosperity.

These wage conditions are also applicable to the hosiery factories at Thalheim, where 45 establishments manufacture cotton stockings principally. It is claimed by manufacturers there that the average wage paid the skilled stocking worker of this section amounts to $7.14 per week, and that $9.52 is nothing unusual.

THE MANUFACTURE OF EMBROIDERED TRIMMINGS.

The manufacture of embroidered trimmings ranks second in importance in this district, and is still conducted by two somewhat different means—the schiffli (or schiffchen) embroidery machine, with pantograph attachment, and the hand machine. Since its invention in 1860 the schiffli machine has been steadily improved, so that it can be used for various kinds of mull muslin and tulle (net) lace in large pieces, upon which 1,800 stitches a minute are embroidered by automatic process. A stitcher at the left of the loom guides the pantograph over the sixfold enlarged pattern outlining the stitches. Special appliances attached to the machine produce particular ornamental stitches, sew on braids and cords, and even enable several chain-stitch seams to be made with one thread. All kinds of textures and tulle can be embroidered. Gold and silver threads can also be used. Robes, stripes, trimmings, insertions, blouses, shawls, aprons, parasols, petticoats, cloths, etc., can thus be embroidered; also velvet, table covers, portieres, lambrequins, upholstery materials, and even rubber belts for the sporting-goods trade.

A recent invention which may revolutionize the colored embroidery process is an attachment supplied with boxes, each containing a certain color. In order to produce differently colored stitchings the threaded needle is passed through the required color and the thread thus colored at will. The rollers which conduct the thread are supplied with a heating appliance to produce rapid drying. The color change operates smoothly and can be made in a few minutes. The colors can always be supplied by the color factory, so as to insure strict uniformity when quick renewal of supplies is needed. Cotton, silk, artificial silk, etc., can all be worked in any genuine color. Guipure lace can thus be made without difficulty. [The product of this innovation is shown by two samples inclosed, which are on file in the Bureau of Manufactures.]

HAND MACHINES USED IN SMALL ESTABLISHMENTS.

There are ten establishments manufacturing embroideries by the schiffchen machine. However, the hand machine is much more in use here, more than fifty establishments preferring the latter. They are smaller concerns and are not conducted on the same extensive

scale as in Plauen and also at St. Gall, in Switzerland, at which places the manufacture is confined to that by the schiffchen machine.

The hand embroidery machine is a "satin-stitch" machine, smaller than the schiffchen machine, and operated by a hand crank between the pantograph and the stitching apparatus. The hand machines used in Saxony have on each carriage side two or three rows of needles. The two-rowed variety is known as the Swiss type, and the three-rowed is termed the Saxon machine. A special contrivance has been invented, whereby the needles are not only threaded, but the threads are knotted. This appliance can be arranged to stitch on a pillow, the replacing of the pillow being the only manual work required. One girl can operate four or five such machines at a time. The machine can thread 25,000 needles daily.

The general advantage of the latest automatic schiffchen machine, both in cost and operation, is that it produces 25 to 30 per cent more stitches than the ordinary schiffchen machine. Another advantage is that larger pieces can be worked, because the machine has a length of 20½ feet, whereas the ordinary schiffchen machine's length is about one-third shorter. The ordinary schiffchen machine works from six to ten times as fast as the hand machine.

OPERATIVES SCARCE AND WAGES HIGH—COST OF LIVING.

The prosperous conditions of the the past few years have not only reduced the supply of operatives by constant absorption, but organization has forced up wages steadily. A few years ago stitchers for the embroidery industry could be had for $4.50 per week; now they average $6 to $7.10. The watchers, or "aufpasser," usually women, who attend the machine and look after its operation while the stitcher guides the pantograph, receive from $2.40 to $2.85. The working hours in summer are from 6 a. m. to 7 p. m. The stitcher is not compelled to work uninterruptedly, as he is paid about 57 cents per 1,000 stitches. Some stitchers have their own machines and receive better pay, averaging from $9.50 to $11.50 per week. One stitcher and one watcher suffice for the operation of a machine, although two watchers insure a better supervision over the apparatus and are frequently employed.

Much of the work, like cutting off and fastening the threads, is performed by the home workers, principally by women and children, who become so adept in the handling of the scissors and thread as to earn from 15 to 20 pfennigs (3½ to 5 cents) per hour.

As to the style of living, the better times of recent years have enabled the working people here to buy more meat and vegetables than formerly. To many meat was a rare luxury, and potatoes and bread their principal nutrition. Potatoes are still the main food, and many operatives have leased small potato patches in the neighborhood of Eibenstock from farmers, who turn the patch over to them when the potatoes are ready for digging. The patches are just large enough to furnish a yield sufficient for the family of the renter.

The cost of living has increased materially here within the last decade for the middle and upper classes, but not so much for the working people, whose income has not only correspondingly been increased, but, owing to the great demand for labor and the frequent scarcity in industrial as well as agricultural quarters, achieved gains exceeding the difference in increased household expenses.

At Kirchberg, Wilkau, and a few other towns in this district spinning and weaving mills and cloth manufactories exist, but the manufacturing and wage conditions there are similar to those prevailing in the adjacent Plauen district, which have been fully covered in reports from that section.

FREIBURG.

MACHINERY AND PRODUCT OF THE MILLS—WAGES AND LABOR CONDITIONS.

Consul E. Theophilus Liefeld furnishes the following information concerning the textile industry in the Freiburg consular district:

All the ordinary kinds of textiles are manufactured here, among the principal lines being women's and men's woolen garments and silk and half-silk goods. One firm makes artificial silk and horsehair.

Another firm is engaged in the manufacture of ramie yarn and ramie goods. This firm is constantly adding to its large factory, and expects to be able to turn out, in a short time, 1,300,000 pounds of ramie yarn per year. The fiber used by this firm is imported from China, where it is grown on the high plateau of the Yellow River. Members of this firm inform me that in their opinion ramie can be successfully cultivated in the Philippines.

During the year 1907 there were exported from the consular district of Freiburg to the United States textiles to the value of $481,885, which was 34 per cent of all exports declared at this consulate. There were in all 788 invoices of textile goods certified to, which was 44½ per cent of the total number for the year.

MACHINERY AND ITS OPERATION.

Much of the machinery in use is of German manufacture, but Swiss, French, and British machinery is also in use. An Alsatian factory furnishes the manufacturers here with considerable spinning and weaving machinery. One of the largest Freiburg firms informs me that its principal machines, especially sewing machines, are of American manufacture.

As the speed varies with the different machines, accurate figures for the respective machines can not be given. I am informed by one firm that the speed is from 80 to 120 revolutions per minute; another reports a velocity of 180 revolutions per minute for certain spinning wheels in his factory, for steam-power machines from 80 to 150, while dynamos and sewing machines have even 3,000 revolutions per minute.

In a great many cases there is one operative for every two or three spinning frames, and for sewing machines one woman for each, while for looms one women operates one to two machines—in all factories a great many of the operatives being women. In some factories, however, one operative tends four weaving machines.

HOURS OF LABOR AND WAGES.

The hours of labor in the mills average about ten per day. At one mill, for example, the working hours were from 6 to noon and from 1 to 5 p. m., with fifteen minutes recess in the forenoon. An Alsatian factory reports the hours of labor as ten and one-half in summer,

with fifteen minutes recess, ten and three-quarters in winter, with thirty minutes intermission. The winter hours are from 6.15 a. m. to 12 noon and from 1 to 6 p. m. Two factories here in Freiburg report their hours of labor ten and one-half per day.

Ordinary laborers in the mills are paid from 48 to 71 cents per day, their overseers from 71 cents to $1.20, while skilled laborers are paid as high as 95 cents, and their overseers $1.67.

That some of the mills are run on a cooperative plan is evident from a recent newspaper report, which states that a textile factory in this district at the close of the year divided $7,140 among its employees, those who had been in its employ more than five years receiving Christmas presents of from $2.40 to $19.

I am unable to learn anything definite about the cost and manner of living of the operatives. One of the firms informs me that their employees usually pay more attention to dress and board than to the comfort of their living quarters. Some spend all their earnings, while others, more economical, save something.

WORKINGMEN'S DWELLINGS.

In several cases where there are a great many employees suitable houses, especially intended for the operatives, have been erected, so as to rent reasonably, and they are generally in great demand. This is the case at Emmendingen, and it is also especially the case in the city of Mülhausen, Alsace, which belongs to the Freiburg consular district, a great industrial center of textile manufactures, with a population of about 100,000. Mülhausen has a workingman's section, where the Industrial Society of Mülhausen has built plain, comfortable houses, and sold them at a low price, really at cost, to the laborers, charging a certain amount monthly, which payments, being regularly made, would, in the course of time, pay all the original costs of building, together with a suitable amount of interest, when the houses would become the property of the occupants. In the year 1901, 1,243 such houses were owned by the occupants, and the recent reports of this society show that it is still active in building such suitable dwellings, and either renting them or selling them, somewhat on the plan of the building and loan associations of the United States.

From the report of 1903 I learn that this society appropriated $26,656 for the purpose of erecting new dwelling houses for workingmen. The recommendations of the committee as to the new buildings were that two kinds of dwellings be built, one with apartments containing two rooms and a kitchen, the other with three rooms and a kitchen, with all necessary adjuncts as to sanitation and comfort provided for, and that the dwellings of two rooms and the kitchen should pay an annual rent of $34, and the one of three rooms $46.

COST OF HOUSES AND METHOD OF PAYMENTS.

Accordingly, from the spring of 1901 to the summer of 1902 the houses containing 12 two-room and 12 three-room apartments were built at a cost, land included, of $1,064 each for the two-room dwellings, and $1,153 for the three-room dwellings. The rents were fixed as follows, not including gas and water: Two-room apartments, ground floor, $2.86 per month; for the first and second floors, $3.09

per month; three-room apartments, ground floor, $3.70 per month; and for first and second floors, $4.17 per month. On September 1, 1902, these apartments were all occupied, housing 137 people, including 83 children.

From the purchase contract it is evident that the purchaser is expected to pay down 10 per cent of the purchase price and a further 10 per cent each year until the place is paid for. This would mean a rent of $5.71 monthly for a house, the value of which is $685.44, and $9.52 monthly for a home worth $1,142 or more. If for any reasons the monthly payments are not made and it seems that the party can not or will not pay, then the society can order the occupant to leave the premises, for, according to the contract, the purchaser is considered as living as a renter until the place is paid for. In such a case a certain amount of the money paid is returned, for the monthly dues were considerably higher than the amount that would have been charged as rent.

[A number of samples of textiles, ramie products, stalks, crude bark, prepared fiber, and thread, and plans of workmen's dwellings, transmitted by Consul Liefeld, are on file in the Bureau of Manufactures.]

GLAUCHAU.

PRODUCTION OF NOVELTIES—TECHNICAL TRAINING OF OPERATIVES.

Consul George A. Bucklin, jr., advises that Glauchau stands preeminent in the production of certain fabrics, from the fact that its manufacturers have always striven to produce complicated novelties, concerning which he writes:

These can be produced here better than almost anywhere else, because the old staff of hand weavers are people of great technical knowledge, and all of the help, such as spinners, dyers, and finishers, have adapted themselves to producing novelties and to overcome almost any difficulty in the way of new creations. Furthermore, Glauchau has a state weaving school, with some very practical and experienced teachers, so that there is always a supply of technically educated help. In fact, men, women, and children are imbued with everything that is connected with weaving goods.

The welfare of the city is dependent upon the weaving industry and upon those industries connected with it. Out of a population of 25,000 inhabitants about one-half are directly interested in the textile industry and about one-fourth more are indirectly dependent upon it, in such work as spinning, dyeing, spooling, making of winding boards, cases, and dealing in paper used for putting up the goods.

The number of firms in Glauchau at present engaged in the textile business is about 10, and these engage (not counting the help for weaving the goods) about 1,000 employees. The value of the output of the largest manufacturer is about $1,500,000 annually. The output of the average factory is perhaps $500,000. The approximate value of the total output of textiles in the city of Glauchau amounts to about $6,000,000 annually, and the foreign countries which are the largest purchasers are the United States, England, and Russia.

HANOVER.

OUTPUT OF FACTORIES, WAGES, HOURS OF LABOR, COST OF LIVING, ETC.

In submitting the following information concerning the textile industry of Hanover, Consul Robert J. Thompson reports that while it is not particularly extensive it is diversified, consisting of wool washing and dressing, cotton spinning and weaving, carpet weaving, etc.:

There is one wool washing and dressing factory in this district employing 1,000 males and 800 females, ten hours constituting a day's work. Every department works with night shifts. The wages are paid semimonthly, with deductions for invalid and old-age insurance. This company furnishes homes to the workers at a nominal rent. Figures charged for rental are not available, but are estimated at $60 per year on an average. Supply stores and a reading room are provided for the employees. The daily wages paid in this factory are as follows (1 mark=23.8 cents):

Description of work.	Males.	Females.	Description of work.	Males.	Females.
	Marks.	*Marks.*		*Marks.*	*Marks.*
Yard work	3.25	----------	Carding	2.25–3.25	----------
First sorting	3.20	1.90	Combing	----------	2.00
Washing and carbolizing	3.25	----------	Ironing	----------	2.00–2.20
Second sorting	3.20	1.90	Chemical department	3.50	----------
Second washing	3.25	----------	Inspectors	3.50–4.25	----------

Business with this company has been very good during recent years, the stockholders receiving dividends of 12 per cent. Wool is bought from Australia, Argentina, South Africa, and from German growers. The wool is sorted, washed, carded, combed, and smoothed. It is then sent to the spinning mills. A special department of the factory is the chemical division, where residues from the other departments are made into wool grease, potash, and artificial manure, Much of this wool grease is exported to the United States.

WEAVERS' WAGES AND MACHINERY.

The wages of foremen working in the principal corduroy and cotton velvet factory vary according to the wages of the male and female weavers working under them, and amount to about 30 to 40 marks ($7.14 to $9.52) per week. Other foremen and the master weavers get fixed weekly wages, varying from 24 to 80 marks ($5.71 to $19.04) according to the ability and the responsibility of the men.

The male and female workers in the weave room and in the shearing establishment do piecework and earn 15 to 28 marks ($3.57 to $6.66) weekly, according to their ability. One workman generally runs two looms; the more skilled run three. The men and women working in other branches of this establishment earn, on an average, about 3.30 marks (79 cents), according to the kind of work they do, per day of 10 hours' work, viz, 6 to 8, 8½ to 12, 1½ to 6—that is to say, 12 hours with 2 hours of rest, as indicated.

In the weave room drum looms are in use, of English and German manufacture. The machines in use in the shearing branch, where

the threads of the weft are cut to form the glossy surface of the velvets, are made in Hanover. Part of the weft is cut by hand. Besides these, a good number of other machines of different construction and make are used. This company makes velvets and corduroys only, samples of which are forwarded. The speed of the looms in use by the company depends on their width and varies between 120 and 170 revolutions per minute. The speed of the machines in the other branches varies greatly and can not be given exactly. The main factory at this place and a branch establishment in the south of Germany belonging to this company, together work 1,850 looms, 250 cutting machines, and 550 finishing and dyeing machines.

COTTON SPINNING AND WEAVING AND CARPET WEAVING.

The leading cotton spinning and weaving factory employs about 800 workers, for the most part women. The wages for spinners are 20 to 28 marks ($4.76 to $6.66) per week, and for helpers from 50 to 75 per cent of this. The self-acting spinning mill and water spinning mill, making yarn Nos. 4–36 and 8–32, respectively, have as tenders women only. The wages are 10 to 15 marks ($2.38 to $3.57) per week, and the same wages are paid in the department for washing, winding, and wrapping. This factory also has 24 houses containing 93 homes, renting at $25 to $40 per year for small apartments of three or four rooms. These houses are old, but there is always a large waiting list of applicants, owing to the cheapness and accessibility of the quarters.

Herat rugs, machine and hand woven, stair carpets, and strips of carpet are manufactured here to a small extent. Self-acting looms are used for carpet weaving, and the knotting is done by hand. Machines have been tried for knotting, but without success. Wages in this line amount to 3 to 3.5 marks (71 to 83 cents) per day for dyers; women and girl workers, tending machines, earn 6 to 13 marks ($1.43 to $3.09) per week.

COST OF LIVING.

The total number of operatives, male and female, is about 1,900, part of whom live in apartments built by the company. The working women are allowed to bring their children to a nursery built by the factory.

The operatives can get meals in special places established for this purpose, and costing 28 pfennigs (6½ cents), each meal containing a liter (1.05 quarts) of meat and vegetables. The houses furnished its employees by this company consist of small stone buildings with two to four apartments of four rooms each—kitchen, living room, and two bedrooms. The rental is 120 to 150 marks ($28.50 to $35.70) per year. Plans of the house are forwarded herewith.

In the children's nursery and hospital, established by this company, about 200 children are taken care of each workday. This establishment has been in existence since 1872, and is for the benefit of mothers who wish to work in the factory, but have no one to take care of their small children. Its staff is composed of doctors, nurses, kindergarten teachers, waitresses, etc. The expense is borne chiefly by the company, in the proportion of 2 to 1. The cost per day per child amounted in 1906 to less than 9 cents, making the outlay for the

mother about 3 cents per day for nursing, feeding, and care of her child. This company pays 7 per cent dividends on its capital stock.

An average income for a male factory worker per year may be fairly estimated at 1,200 marks ($285.60). To this should be added 200 to 300 marks ($47.60 to $71.40), which may be earned by the wife or children. This income will be disposed of generally in the following manner, amounts given for the year being for a family of five: Apartment or flat, 260 marks ($61.88); clothing, 150 marks ($35.70); food, fuel, and light, 720 marks ($171.36); recreation, 100 marks ($23.80); total expenditures, 1,230 marks ($292.74). [Samples of cotton velvets and corduroys, and plans of the houses occupied by factory employees, which accompanied Consul Thompson's report, are on file in the Bureau of Manufactures.]

LEIPZIG.

NUMBER OF WORKERS AND WAGES PAID IN SAXONY'S TEXTILE INDUSTRY.

Consul Southard P. Warner, of Leipzig, states that the importance of Saxony as a textile center is well shown by interesting figures which have been published by the imperial insurance office, from which he compiles the following:

During the twenty years from 1886 to 1905 the number of insured workmen in the German textile industry increased from 473,700 to 732,500, or 55 per cent. In Saxony the number of textile workers increased from 116,000 to 225,300, or 94 per cent. In 1886 Saxony employed about 24.5 per cent, and in 1905 about 30.7 per cent of all persons engaged in textile manufacturing in Germany. The total wages paid in Germany to textile workers increased from $62,118,000 in 1886 to $122,570,000 in 1905. Those in Saxony increased from $14,756,000 in 1886 to $36,652,000 in 1905.

The following table gives the number of insured workmen and the wages paid in the textile industry in each of the six districts of the German Empire for the years 1886 and 1905:

Districts.	Persons insured.		Per cent increase.	Wages paid.		Per cent increase.
	1886.	1905.		1886.	1905.	
Saxony	116,000	225,300	94	$14,700,000	$36,700,000	150
Northern Germany	105,000	124,000	18	13,600,000	21,900,000	61
Rhineland-Westphalia	92,300	138,600	50	13,600,000	27,100,000	99
Southern Germany	64,500	119,200	85	8,300,000	18,300,000	120
Alsace-Lorraine	57,500	67,200	17	8,300,000	11,200,000	35
Silesia	38,400	58,200	52	3,600,000	7,400,000	106
Total Germany	473,700	732,500	55	62,100,000	122,600,000	97

As will be seen from the foregoing statement, Saxony shows the greatest increase in the number of insured workmen and also in the wages paid.

AVERAGE WAGES—BENEFIT OF TEXTILE SCHOOLS.

The average of the yearly wages paid in the German textile industry in 1886 was $128.44. In 1905 the average was $163.66, an

increase of 27 per cent. The following table shows the average yearly wages paid in the six districts for the years 1886 and 1905:

District.	Average yearly wages.		Per cent increase.	District.	Average yearly wages.		Per cent increase.
	1886.	1905.			1886.	1905.	
Saxony	$127.33	$162.79	28	Alsace-Lorraine	144.94	166.36	15
Northern Germany	129.23	176.60	37	Silesia	92.82	126.62	36
Rhineland-Westphalia	147.08	195.87	33	Total Germany	128.44	163.66	27
Southern Germany	129.23	153.75	19				

The textile workmen engaged in the so-called " home industry " are not included in these figures.

In 1895, the figures for the occupation census of 1905 not yet having been published, the number of industrial workers in Germany was 10,270,000, Saxony's share being 1,150,000. The number of persons employed in the textile industry of the Empire was 993,000, or 9.7 per cent of all industrial workers. In Saxony the textile workers numbered 267,000, or 23 per cent of all industrial workers. In 1895 27 per cent of all the German textile workers were employed in Saxony. From these figures can be seen what an important part the textile training schools have played during recent years in the development of Saxony as a textile center. In 1906 the total number of factories in Saxony was 23,000. Of these, 5,300, or nearly 25 per cent, were textile establishments.

MAGDEBURG.

TEXTILE INDUSTRY SMALL—WAGES OF THE OPERATIVES.

Consul Frank S. Hannah reports that the Magdeburg consular district is not a textile manufacturing region, no goods of this description being manufactured for export to the United States, although one or two local exporters purchase small quantities of textile goods from the big manufacturers in the Kingdom of Saxony and ship them to the States. The consul continues:

There are, however, one or two small concerns here engaged in the manufacture of cotton goods, from whom the following information has been obtained: The wages paid overseers are 36 to 50 marks ($8.57 to $11.90) per week. The male mill-operatives receive 30 to 36 marks ($7.14 to $8.57) and the female 12 to 18 marks ($2.86 to $4.28) weekly. These wages are paid and the work done entirely by piecework. The average hours of labor are fifty-nine hours per week, ten hours constituting a day, with the exception of Saturday.

The cotton-spinning machines are made in England and in Alsace. The looms and the machines for coloring are made in Germany and the bleaching machinery in Switzerland.

As the industry here is so small and the number of operatives so limited, a general provision for cheaper rent and the furnishing of supplies at reduced prices, as is sometimes the case with large manufacturing corporations, does not enter into consideration. The majority of the operatives here are girls, who live with their parents under the ordinary conditions prevailing in the local working classes.

MUNICH.

FACTS OBTAINED UNDER DIFFICULTIES—WAGES AND COST OF LIVING.

Consul-General Thomas W. Peters, writing from Munich, Bavaria, says:

Information in regard to textile manufacturing here is very meager, some firms absolutely refusing to give out anything. There are very few shipments, and even these, under the new regulations, are not subject to an expert examination before certification of invoices, as was formerly the case. Manufacturers can and do refuse any request made regarding manufacturing conditions.

A number of large mills making cotton and linen goods are situated at Augsburg. The wages paid to the overseers and weavers range from $1 to $2.25 per day, while the unskilled workmen receive 75 cents.

The speed of the machines varies according to the grade of goods manufactured, but ranges from 120 to 450 movements per minute. One man takes charge of 15 machines making ordinary plain goods, while in some high-grade goods 2 to 4 machines are operated by 1 person. The cost of living is from $190 to $476 a year, according to the size of family. There are small houses for two families and also tenement houses, the rent for 3 rooms and a kitchen amounting to from $30 to $50 per annum.

PLAUEN.

CONDITIONS AMONG THE FACTORY WORKERS IN SAXONY.

Consul Carl Bailey Hurst, of Plauen, presents the following review of the textile industry in that part of Germany, and describes conditions among the factory operatives:

The manufacture of machine-made laces by means of embroidery comprises the chief industry of Plauen, to the exclusion of woven cloths, which are produced in other parts of this district, principally in the towns of Greiz and Reichenbach. It is to these places that one must look for information as to the textile industry in this section of Saxony.

The wages paid to those employed in the weaving mills vary considerably. The scale of even two years ago is not applicable now. The tendency is toward a general increase, but the periods of activity and depression, the disturbances caused by small demand, strikes, and higher cost of raw materials must be frequently taken into account in giving the average rate of wages.

LESSENED PROFITS DUE TO MARKET UNCERTAINTIES.

The manufacturers, in their endeavors to make a fair profit, are constantly harassed by the uncertainties of the market, and such factors tend to have a lowering effect on wages; but once the wages are raised it is difficult to reduce them again, no matter how urgent the reason. There are complaints from both sides. The manufacturers are working at less profit than ever before, and the operatives are looking to a further increase in pay. Some older houses, after having taken in the sons of the members of the firm, find that the profits have become so

divided that there is no longer a competence for most of them. The situation has reached such a condition that some firms in this locality are dissolving old existing partnerships, as the business is not sufficiently remunerative for all partners. It is the intention, however, of most of such members to continue on their individual accounts.

Notwithstanding this narrowing in the margin of profits in the local textile industry, the demands of the operatives are not without foundation. It is not that there is so much money made in weaving here, but rather that the cost of living has increased in such marked degree that the wages of a few years ago do not suffice to-day. It is the clamor, not for the comforts of life, but for the bare necessities, that makes mill hands seek for higher pay.

WAGES OF OPERATIVES.

Women and girls are employed very largely in the factories. The average wages paid to overseers range from 24 to 40 marks ($5.71 to $9.52) a week, only in rare instances higher than this. The wages paid to operatives, on an average, are nearly 16 marks ($3.81) a week. This latter rate was established the beginning of last year, when the average weekly payment was 13.99 marks ($3.33). The employers say that a number of the workmen do not earn the pay they receive in relation to the work done. Operatives are striving to have a minimum of 18 marks ($4.28) a week established. This is being strongly opposed by most manufacturers. Before the latest increase in wages was granted, the operatives, both sexes, divided into four classes, earned as follows:

Class of weavers.	Wages per week.	
	Marks.	*Dollars.*
Up to 16 years of age	10.38	2.47
From 16 to 21 years	12.96	3.08
From 22 to 55 years	16.08	3.83
Over 55 years of age	13.38	3.18

There are, of course, exceptions in different places, and one finds wages in some cases as high as 18 marks ($4.28) per week being paid, which counterbalance some wages as low as 7 marks ($1.67) a week.

STRINGENT LAWS REGULATING HOURS OF LABOR.

There are very stringent laws for the observance of hours of labor for operatives, and as far as the regulations are not promulgated through the imperial federal council they may be fixed through the central authorities of a German State or through police regulations applicable to this district. Before the issuance of such regulations opportunity must be given the chairman of the interested trade guild to express an opinion on the subject. By decision of the federal council, regulations can be laid down for industries in which, through excessive duration of daily working hours, the health of the employees is threatened; also, the length, beginning, and closing for the permissible daily period of work and the intervals of rest to be allowed.

It is required that regulations as to working hours, as well as the rests for adult operatives, shall be conspicuously posted. When by reason of accident the regular work of a mill is interrupted the daily period of work may be extended later by the imperial chancellor.

In urgent cases the local authorities can permit such exceptions, yet in no instance for over fourteen days. This is besides the permission, also obtainable through the local authorities, to mill owners during seasons when there is an unusual accumulation of work to have their operatives work overtime, not, however, on more than forty days within one year.

The exact hours vary considerably, according to the mills. Some begin in summer at 7 in the morning and close at 7 at night, and in winter the hours extend from 7.30 a. m. to 7.30 p. m.; others, for adult workers, from 6 a. m. to 7 p. m. in summer, and in winter from 7 a. m. to 8 p. m. For children from 14 to 16 years, from 6 a. m. to 6 p. m. in summer, and from 7 a. m. to 7 p. m. in winter. Rests are allowed for adult workers as follows: From 9 to 9.15 a. m., from noon to 1.30 p. m., and from 4 to 4.15 p. m. For operatives from 14 to 16 years of age, from 9 to 9.30 a. m., from noon to 1.30 p. m., and from 4 to 4.30 p. m. In some smaller places the rests are arranged in summer from 8.30 to 9 a. m., from noon to 1 p. m., and from 4 to 4.30 p. m.; in winter from 9 to 9.30 a. m., from noon to 1 p. m., and from 4 to 4.30 p. m.

FEMALE AND YOUTHFUL EMPLOYEES.

According to the law, mills must permit female operatives over 16 years of age who have a household to care for to leave, at their own request, a half-hour before the midday interval, provided that there is not allowed at least an hour and a half as the regular dinner hour. During the recesses the machines will be stopped. Young operatives are not allowed to remain in the working rooms. They have to retire to a specially assigned room, if they do not go outdoors. The bringing of food and drink is only permitted during the prescribed periods of rest. Female operatives must not be kept at work after 5.30 p. m. on Saturdays or on the day before holidays. For adult female operatives the afternoon recess on such days is to be omitted.

Female operatives may not be employed in the mills from 8.30 p. m. to 5.30 a. m., and on Saturdays and the days preceding holidays not after 5.30 p. m. The employment of female operatives over 16 years of age must not exceed a total of eleven hours daily, and on Saturdays and the days before holidays may not exceed ten hours.

Children under 13 years of age must not be employed at all in mills; children over 13 years old may only be employed, if they are not obliged longer to attend public school. The employment of children under 14 years must not exceed six hours daily. Young people between 14 and 16 years of age must not be kept at work in the factories more than ten hours a day. The work hours of young operatives must not begin before 5.30 a. m. and must not continue later than 8.30 p. m. Young operatives who work only six hours a day must have a rest of at least a half hour. Other youthful operatives must have at least one hour at noon and a half-hour each in the morning and afternoon. A morning and afternoon rest need not be granted, provided that the young operatives are not at work over eight hours altogether, and the duration of one uninterrupted period of labor does not exceed four hours. On Sundays and holidays young operatives must not be employed at all or at those hours which

heir clergymen have set apart for the religious instruction of such peratives.

Operatives under 17 years of age, who are obliged to attend compulsory school courses at certain times during the week, will receive he necessary liberty, but they must state their school hours in advance at the office of the mill.

INSPECTION OF MILLS—MACHINERY AND PRODUCTS.

It is probably known to American textile manufacturers that the veaving mills in this district are practically closed to expert inspection except to the Government. While showing every courtesy to nquirers, a divulgence of information which may or may not be ecret is in many instances withheld, and when imparted it is with he understanding that any data supplied will be in no way made ublic. This policy is followed to avoid giving any possible aid to competitors.

The peculiar finish given the woolen dress goods of Reichenbach nd Greiz has enabled them to be sold in the United States, in spite of the fact that the original value on the German market is often considerably more than doubled by the time they reach the wholesalers in New York.

The machinery employed in making lady's cloth and similar textiles often varies, because manufacturers have had certain alterations or improvements added that are not found in other mills of the same locality. All looms used for weaving woolen cloths are of German origin, and in most instances are made by a Chemnitz firm or by a firm at Furth, near Chemnitz, and cost about 800 marks ($190.40) each. The latter firm also furnishes a machine for dressing the warp for 4,000 to 5,000 marks ($952 to $1,119). French machines are occasionally used for the same work, and cost from 8,000 to 9,000 marks ($1,904 to $2,142). They take up less space and do double the work of the usual machine, but when a yarn breaks the machine must be stopped until the damage is repaired. The consequent loss is accordingly greater.

New weaving looms made in Plauen are to be put on the market before long and will possess important improvements that bid fair to make them a valuable innovation. One of the simpler looms now in use making Reichenbach cloth is generally operated by one man. A single loom finishes, under the most favorable circumstances, a piece of 50 meters (54.68 yards) in length, from 90 to 130 centimeters (35.43 to 51.18 inches) wide, during the ten and one-half working hours of a day. Four times 50 meters of Jacquard stuffs may be made in a week.

Forty-four samples of henriettas, voiles, broadcloths, cashmeres, serges, and fancy stuffs made in this district are submitted herewith [on file in the Bureau of Manufactures], giving the weight per square meter, kind of yarn used for weft and for warp, price of weft and of warp per kilo, cost of weaving per 100 meters, and other relevant items.

EFFORTS OF OPERATIVES TO BENEFIT THEMSELVES.

The rise all over Germany in the cost of living has attracted considerable attention during the past two or three years. The prices of meat went to a figure never reached before, and although there

has been a slight decline they will probably never descend to their former level. Manufacturers here have, of their own initiative, and also by reason of formal demands and strikes of the operatives, advanced the wages of weavers in general, but the increase has not kept pace with the higher cost of living, and the result tells heavily on the mill employees. The Government has bureaus to facilitate the employment of those out of work and there are private societies to improve the condition of the working people.

The operatives are themselves banding more together, aiming at a solidarity, which will be at the same time of political influence, to the end that measures may be enacted of benefit to them in getting higher wages, shortening the work hours, and obtaining other advantages. The operators hope to compel mill owners to accord them a fixed minimum rate of wages in excess of what they now receive. Through their own journals, labor unions, and labor leaders they maintain an unceasingly active campaign that will enable them to meet the higher cost of living.

Herewith I submit a form [on file in the Bureau of Manufactures] that is filled out by those joining the Union of German Textile Workers, the headquarters of which is in Berlin. On this form the name of the operative has to be given, the date and place of birth, residence, firm by which he or she is employed, the department in the mill and the machine number, whether married, and how many children under 14 years of age. It must be also stated on the form how many hours the operative works a day and what the average earnings are per week. Membership is divided into four classes, paying 20 pfennigs ($0.0476), 30 pfennigs ($0.0741), 40 pfennigs ($0.0952), and 50 pfennigs ($0.119), respectively, a week. The admission fee is 30 pfennigs ($0.0714). The first class is only for male and female workers under 18 years of age. The other three classes may be entered by all operatives without regard to age or sex. The relief funds are eventually distributed according to the class and the number of weekly dues paid. While seemingly light, these fees are in many instances not paid without sacrifice on the part of the operatives. In further connection with the cost of living, the obligatory contributions to the State old-age and accident insurance, as well as to the sick funds, must also be counted.

ECONOMY IN LIVING—FOOD OF THE WEAVERS.

The families of the working people are rarely small, and it is not infrequent to find a man and his wife and several children subsisting on $3.81 a week. From this amount rent, clothing, food, fuel, and other necessaries have to be paid. In many instances, however, the wife is also a wage-earner as well as the man, and the children go to work as soon as possible. Such families usually live in a kitchen and one other room. There the family cooks, eats, and sleeps. The rent for such an apartment is rarely less than 10 marks ($2.38) a month, the general price being about 15 marks ($3.57). Some of the operatives are better placed and have their own small dwelling in the suburbs with garden attached. It may be remarked that on Sundays or holidays, when enjoying an outing, the operatives always appear well and comfortably dressed. A ragged or barefooted person is a most unusual sight.

Food is of necessity quite simple. One person thoroughly acquainted with the life and conditions of operatives here says that the principal nourishment of the weavers consists of potatoes and salt, bread, and a so-called pepper soup, made of water, bread, a little fat, and plenty of pepper. Meat is seldom eaten, and when indulged in at all is usually in a form of soup meat or sausage. Operatives generally eat five times a day, and rye bread is nearly always taken. The first breakfast consists of coffee, made chiefly of roasted grain, and a piece of bread or roll. Sometimes a bowl of hot water with a little flour stirred in is taken instead of coffee. The dinner is at midday. The morning, afternoon, and evening meals are much lighter, and in them beer often occupies a place.

That operatives can manage to live on this small income is evidenced by the thousands of persons working from one year's end to another in the textile mills. They are exerting themselves to better their condition and they have sympathizers here in all classes of society, not excluding many mill owners.

STUTTGART.

WOOLEN YARN MILLS—STATUS OF OPERATIVES.

Consul Edward Higgins makes the following report from Stuttgart on the spinning of woolen yarn in that German district:

There is no export to the United States of woolen cloth or yarns from this district, which comprises the kingdom of Wurttemberg and the principality of Hohenzollern. There is no manufacturer of woolen goods in the district and only a few factories making woolen yarns. The facts contained in this report come from the largest firm in the district, employing about 500 hands. The wages paid overseers vary from 120 to 200 marks ($28.56 to $47.60) per month. A female operative earns from 2 to 2.8 marks (47½ to 66½ cents) per day and a male operative from 3 to 4.3 marks (71 cents to $1.02) per day. Eleven hours a day constitute the regular hours of labor for six days in the week. Some English machinery is used, but the great bulk is German. The machinery is run at a speed of 3,000 to 3,500 turns per minute for knitting yarns, to 5,000 turns per minute for weaving yarns. The production is knitting yarns and fancy colored yarns for weaving purposes.

In the preparatory department one operative generally tends two machines, while in the spinning department the rule is one machine to one operative. The output of these mills is largely sold to woolen weavers in Germany, Austria, and Switzerland.

COST OF LIVING AND HOMES OF THE WORKERS.

The Wurttemberg factories are located in small country villages, where a tenement of three rooms and kitchen can be had for 180 to 200 marks a year ($43 to $47). The operatives live largely on potatoes and bread, with very little meat. Some factories furnish dinner to their operatives, consisting of meat, vegetables, and bread, at 25 pfennigs (6 cents), in a dining hall connected with the factory.

In many places the houses occupied by the overseers and mill workers in the textile industry of Wurttemberg are built by the proprietor of the mill. An insurance company of Wurttemberg advances 50 per

cent of the cost of building and as security this insurance company receives the first mortgage on the houses. This company charges 3 per cent interest. The owner of the mill generally takes the second mortgage and advances the other 50 per cent of the cost of building. He also charges a low rate of interest. The workingman occupying one of these houses must pay the interest on the first and second mortgages and a small stipulated sum (about $25) every year on the mortgages. It takes about thirty years for the mill operator to get a clear title to the dwelling. A small garden is connected with each house.

ZITTAU.

OUTPUT OF VARIOUS SPECIALTIES FROM AMERICAN FIBER.

Consul Clarence Slocum, of Zittau, furnishes the following report on the manufacture of cotton goods in his consular district:

The ever increasing use in Germany, as in all other countries, of articles made of cotton has contributed greatly to the general prosperity of this district, in which are located some of the oldest cotton mills in the Empire, their establishment dating from 1666. While in Zittau proper only a small percentage of the manufactures can be classed under this heading, four large adjacent villages—Neugersdorf, Ebersbach, Seifhennersdorf, and Grosschönau—with a total population of nearly 40,000 people, are famed each for its special line of cotton manufacture and possess some of the largest mills in the German cotton trade.

It is interesting to note that the bulk of the goods woven in this district are made from American cotton, the yarns used ranging from 8s (8 hanks to the pound) to 50s count, single and double, while 16s to 26s comprise the range of counts of the bulk of the material used. As there are comparatively few spinning and doubling plants in this district, the yarns are principally supplied by spinners in southern Saxony, Bavaria and Rhenish Prussia.

AMERICAN COTTON CONSUMED.

No statistics are published as to the number of bales of cotton used by local manufacturers, but from figures obtained I estimate the consumption of raw American cotton at from 60,000 to 70,000 bales. This quantity of material is used to supply, approximately, 16,000 looms, which furnish employment for some 25,000 work people in addition to those engaged in the allied trades of dyeing, finishing, sizing, etc. The goods principally manufactured comprise plain and fancy dress goods, vestings, coatings, trouserings, sheetings, Turkish towelling, flannelette, blankets, rugs, and colored fancy table covers.

A conservative authority informs me that the domestic consumption of the local cotton productions equals fully three-fourths of the district's output, while the balance is exported to all parts of the world, in part through connections of the various manufacturers and also through the active agency of various Hamburg houses.

In so far as this district's trade relations with the United States are concerned, articles made of cotton rank second to linens in point of volume of business accomplished, the total shipments for the fiscal year 1907 having reached the sum of $225,019, out of a total declared export return of $1,625,474.

AUSTRIA

COTTON MILLS AND EQUIPMENT.

COTTON MANUFACTURING THE LEADING INDUSTRY—IMPROVEMENTS IN MILLS AND MACHINERY.

During 1906 and 1907 Austria enjoyed an unusual measure of prosperity, and this was especially felt by the cotton industry. A series of five years of exceptionally good crops have increased the absorptive power of the people to a degree that more than compensated for the decline of their exports to one of their principal markets caused by the customs war with Servia. The quality of the production has been raised and the mills now produce yarns and cloth that were formerly exclusively imported. The imports of cotton manufactures do not as yet show any decrease in quantity, but the home mills have filled a large part of the enlarged home demand that would otherwise have been secured by foreign mills, and in addition the Bohemian mills have shipped good quantities of yarn over the border to supply the needs of Saxon weavers.

The Austrian spinners have not felt the present financial disturbances of the world as much as have the weavers, for they are engaged longer ahead, in many instances for the whole of 1908, while the weavers have future orders for only a few months. The effects of the present financial situation is seen in the sudden holding up of the mill-building boom that has been in full swing in Austria for the last two years. It is estimated that during 1906 there were 400,000 spindles and during 1907 some 600,000 spindles, added in this industry alone, but these are estimates, and there are no definite figures available. The increase, however, has been such as to make cotton manufacturing the leading industry of Austria.

LOCATION OF THE MILLS.

The cotton mills in Austria divide themselves into four separate groups: The Bohemian mills along the northern border, the lower Austrian mills lying just south of Vienna, the Vorarlberg mills, and the mills around Trieste.

The first section, the Bohemian mills, is by far the most important, and Bohemia now contains about 60 per cent of the mills of the country. These mills lie along the northern border and are geographically and commercially close to the Saxon and Silesian mills just over the line. Some Saxon mills depend for their yarn on the Bohemian spinner and when, as in 1906, the German weavers have

an unusually flush period this business increases largely. The center of the Bohemian cotton industry is Reichenberg, which is therefore practically the center of the industry in Austria. Within a short distance from this place are many cotton-manufacturing towns, including such places as Grottau, Ketten, Kratzau, Machendorf, Turnau, Halbstadt, Eisenbrod, Josepstadt, Tannwald, Morchenstern, etc., all of which are steadily growing in importance as cotton-mill centers.

RIVALRY BETWEEN CZECHS AND GERMANS.

The Bohemian cotton industry was started and is now owned by German-speaking people of German descent. The Czech-speaking people, however, have begun to start an industry of their own, and have built up quite a group of mill towns which center around Nachod, not far to the eastward of Reichenberg. Of some 6,318,000 people contained in Bohemia, about two-thirds are of the Czechish-Slavonic race, and the others are mainly of Teutonic descent. These latter are scattered but occupy mainly the western and northern portions, while the Czechs are strongest in the central and eastern portions. There is great rivalry between the two races and this rivalry at present is having its effect in stimulating each to get ahead of the other in extent of business and has led to many new mills. The Bohemian industry in general has the advantage of proximity to coal fields, of a better class of help, and of being in closer touch with the great manufacturing nation over the border.

The second section of mills are grouped just south of Vienna and especially around Pottendorf. This section of lower Austria is one of the oldest cotton-manufacturing localities in Austria, and before the time of railroads or of modern mill machinery was quite a hand-loom center, and cotton from Adana, Smyrna, Greece, etc., was brought in at Trieste and then carted a long distance and through some steep mountain passes over to the lowlands of this section. These mills are nearest to the export commission houses which are mainly centered at Vienna, and enjoy favorable banking advantages, but their class of help does not seem to be quite as good as that of Bohemia, and recently with the increase in mills and the drafts made on them for operatives by Hungarian mills there has been a scarcity of labor.

The third group of mills lie in the Vorarlberg, which is the extreme western section of Austria that juts up into the Swiss highlands. The mills in this section are largely dependent on the embroidery trade for the consumption of their yarns and cloths, and their profits rise or fall with the prosperity of this branch of industry. They ship some goods to the Swiss embroidery factories lying around St. Gall, but otherwise they do little export business.

The fourth and smallest section of the Austrian cotton-manufacturing industry lies in Kustenland and Krain around Trieste. These mills use a larger proportion of East Indian cotton than the other mills. They are more favorably situated for export, but the labor difficulty is greater in regard to quality as well as quantity of help, the mills are more isolated, and they are farther from the machinery makers, from the bleacheries and dyehouses, from the financial centers, etc., so that the industry is not building up much at this point.

SPINDLES AND LOOMS.

In regard to the actual number of spindles and looms in Austria there are no Government or authoritative figures available. The latest figures that the Austrian Cotton Spinners' Association was able to give were those for January 1, 1907. These figures are as follows:

Districts.	Spindles.	Districts.	Spindles.
Bohemia	2,179,091	Styria	42,472
Vorarlberg and Tyrol	414,604		
Lower Austria	388,140	Total	3,512,122
Moravia and Silesia	207,429	Hungary	139,682
Upper Austria	149,820		
Krain and Istria	130,566	Grand total	3,651,804

These figures are only valuable as an indication. In Hungary, for instance, the total of spindles in operation and erection is now (February, 1908) somewhere between 180,000 and 200,000, and, assuming that the total increase in the Kingdom during 1907 reached the figures usually estimated, the number of spindles in Austria alone is now something over 4,000,000.

The majority of the mills in Austria are small, but the tendency is for companies owning several small plants to gradually build up the best-located one and drop the others. The mills are increasing in size from this cause, and also because most of the new mills are of larger size than heretofore usual.

AUSTRIAN MILLS WITH OVER FIFTY THOUSAND SPINDLES.

The cotton-manufacturing companies in Austria operating over 50,000 spindles each are as follows:

Company.	Spindles.	Town.	Section.
Johann Liebig & Co	131,856	Eisenbrod	Bohemia.
Johann Erben Priebsch	131,732	Morchenstern	Do.
Herm. Pollak's Söhne	100,352	Braunau	Do.
Friedrich Kubinsky	85,000	Beraun	Do.
Jenny & Schindler	84,432	Bregenz	Vorarlberg.
Friedrich Schmidt	72,500	Iserthal	Bohemia.
A. G. der Baumwolle Spinnerei Trumau und Marienthal.	70,708	Trumau	Lower Austria.
Benedikt Schroll's Sohn	70,000	Halbstadt	Bohemia.
J. B. Limburger, jr	67,000	Ketten	Do.
K. k. priv. Pottenderfer Baumwoll-Spinnerei und Zwirnerei.	65,000	Pottendorf	Lower Austria.
Getzner, Mutter & Co	64,152	do	Do.
Franz Priedl	62,882	Bohm-Kamnitz	Bohemia.
Herrburger & Rhomberg	58,272	Dornbirn	Vorarlberg
A. G. der Kleinmunchner Baumwoll-Spinnerei und Mech. Weberei.	57,784	Linz	Upper Austria.
Johann Munzberg & Co	56,454	Theresienau	Bohemia.
Johann Gottfried Haebler	56,000	Warnsdorf	Do.
Gebruder Grohmann	56,000	Bensen	Do.
Mako-Spinnerei Cichorius & Co	54,332	Kratzau	Do.
Friedrich Mattausch & Son	54,130	Franzenthal	Do.
F. M. Hammerle	51,336	Dornbirn	Voralberg.
S. Kratzau	51,300	Nachod	Bohemia.
Cosmanos Vereingte Textil- und Druckfabriken	50,000	Grottau	Do.

The largest weaving mill is the Aktien-Gesellschaft Osterreichische Textilwerke, formerly Isaac Mautner & Sohn, which has 2,397 looms at Grunwald, near Gablonz in Bohemia.

The largest Austrian cotton manufacturing company is seen from the above list to be that of Johann Liebig & Co. The beginning of

this company was in 1806, when Count Christian Clam-Gallas, in company with a certain Francke, of Reichenberg, established a cotton-spinning mill, which began work on October 7 of that year under the registered firm name of Clam-Gallas, Francke & Co. This factory was sold in 1808 to Balabene & Co., and by them in 1828 to Gebruder Liebig. This firm, since changed to Johann Liebig & Co., enlarged the factory as their business increased, and, besides at Reichenberg, now have mills at Eisenbrod, Haratitz, Swarow, and Mezivod, with a total of 131,856 spindles and some 2,400 looms, and employ 4,500 workers.

MACHINERY ADVANCES IN PRICE.

The prices paid for cotton-mill machinery by Austrian mill men are much higher now than they were two years ago. This is due to the effect on the textile-machinery trade of the great mill-building boom in England. This has so absorbed the production of the English textile-machinery firms that not only have they raised the price 25 per cent more, but they will not quote on orders except for very late delivery, in some cases twelve to eighteen months' time. This situation has been of great benefit to the Austrian textile-machinery manufacturers, and they have taken advantage of the same and a good many new firms have started in this business. They have not yet the perfection of the English, nor do they manufacture in as large quantities, and the English in normal times can still control the Austrian market on this line. In regard to present prices there is quite a fluctuating market, and no prices could be quoted that would apply to all.

At Prague a large manufacturer, who has recently purchased machinery, gave me the prices he paid in the latter part of 1907. The cards cost in England £100 each, and, adding 10 per cent for packing and then the transportation and duty charges, the cost landed at Prague was about 3,000 kronen, or, say, $609. The ring spinning frames cost 8s. 6d. a spindle in England, and the price landed at Prague came to 6,000 kronen per 450-spindle machine, which is about $1,218.

At Reichenberg the February, 1908, prices were given by the mill men as follows:

Description.	Kronen.	Dollars.
Bale breaker	1,300.00	264.00
Ten-meter dust trunk, with hopper feeder	1,400.00	284.00
Exhaust opener, with one beater and lap apparatus	1,180.00	240.00
Single Crighton opener	2,600.00	528.00
Double Crighton opener	3,400.00	690.00
Lapper	3,300.00	670.00
Revolving flat card, with appurtenances	3,100.00	630.00
Draw frame with 3 by 6 deliveries	4,200.00	853.00
Draw frame with 3 by 7 deliveries	5,200.00	1,056.00
In general per draw-frame delivery	240.00	49.00
Slubber of 84 spindles	4,300.00	873.00
In general per slubber spindle	52.00	10.50
Intermediate of 128 spindles	5,000.00	1,015.00
In general per intermediate spindle	40.00	8.12
Fine frame of 168 spindles	5,200.00	1,056.00
In general per fine-frame spindle	32.00	6.50
Self-actor mule for warp per spindle	8.80	1.19
Self-actor mule for filling per spindle	8.20	1.67
Ring spinning frame per spindle	12.40	2.52
Looms for gray goods 110 centimeters wide	350.00	71.00

The great bulk of the Austrian cotton mills are owned by private parties, and "Aktien-Gesellschaft," meaning stock company, is seen before the names of few mills. One reason of this is that taxes are cheaper for a private mill than for a stock company, and another is the fact that private companies who have no shares to list on the exchanges do not have to publish their statements in the papers, as do stock companies. Owing to the increase in mills in the last two years, and the interest that is taken in cotton manufacturing by the general public, there are now an increasing number of stock companies listed and some private mills have changed to stock companies.

SPINDLES—SPEED OF MACHINERY—COAL.

The majority of the spindles in Austria are mule. There are no statistics on this point, but large manufacturers estimate the mule spindles as double the number of ring spindles. The bulk of the spinning machinery is of English make, while the majority of the weaving and finishing machinery is Austrian and German. Machinery from all the large English concerns is seen more or less. One of the most popular Austrian textile machinery firms is that of G. Josephys Erben, at Bielitz, but there are other textile machinery firms at Reichenberg, Jagersdorf, and other Bohemian and Silesian centers, as well as some at Vienna. The number of Austrian textile machinery manufacturers is increasing, and they are making more efforts to control their home markets. German machinery is mainly imported from Chemnitz, and some from Mulhausen. They are beginning to get quite a foothold in spinning machinery, which is a line that England has heretofore monopolized.

In regard to speed of machinery, there is nothing to be said of value. The mills base their speeds on the English catalogues and production tables and run as near the speeds given as the quality of their help and material will permit. For instance, on a good quality of Cabots I found that the Austrian weavers run their looms at the ordinary 180 picks to the minute, but some claimed to run 200 or over, and others using lower-grade materials could not get over 160. About one-third of the 650,000 bales of cotton imported into Austria comes from India, and where this is mixed with American, or where low-grade American cotton is employed, the speed is necessarily curtailed.

The Bohemian mills are situated in proximity to coal fields, and they have cheap fuel, but the quality is low. Ordinarily the Bohemian coal fields supply the home demand, but in 1907 the consumption overtook the production and coal had to be imported, and prices ran somewhat higher than usual.

INCREASE IN STRIKES AND LOCKOUTS.

There has been a great increase in industrial, especially textile, strikes and lockouts in the last two years. This may be explained partly by the better industrial conditions which make the need for labor more apparent, the workmen taking advantage of this situation to better their condition, and partly by the increased cost of living. Unions are increasing in number and activity and many strikes now involve a whole branch of industry instead of being en-

tirely localized as formerly. These strikes have caused similar organization of employers, and in many cases such movements are now answered by lockouts at their inception. In general, strikes are for higher wages and shorter hours, but also a good many are for other objects, such as increased compensation for overtime and Sunday work, for early closing on Saturdays and before holidays, for recognition of the union and of walking delegates, etc. In the majority of cases the workmen have won as regards wages and hours. The demands for the recognition of the union also do not meet with as general a refusal as formerly, and this is shown by the frequent intervention of laborers' organizations in wage agreements. In some cases part of the wages were given in beer tickets instead of cash, and some mills made it obligatory for the operatives to take board and rent of their employers. Strikes to remedy these conditions were also successful.

The longest strike in textile circles was in the latter part of 1906 at Reichenberg, and lasted over eighteen weeks. It resulted in the recognition of the union; in granting "Laborers' Day," May 1, as a holiday; in a compensation of 90 heller per loom when bad material is furnished; an increase of wages in various kinds of labor; tariff to be published on the wall; married women to be entitled to leave at 11.30; lunch to be brought to the mill by special hands; compensation of narrow goods on wide looms to be according to a special tariff; no new laborers to be accepted for a certain period after the strike, etc.; while the strikers obliged themselves not to interfere with those who remained at work and did not strike. The Government intervened in a good many of the strikes and lockouts.

In the smaller mills the working conditions as to light, cleanliness, etc., are not as good as they might be, but in the majority of the mills, especially the large ones, they are very good.

WAGES AND LABOR CONDITIONS.

EARNINGS OF OPERATIVES IN THE COTTON MILLS—PROVISIONS OF THE INSURANCE AND PENSION FUNDS.

In regard to wages paid in Austrian mills there is great variation between the different sections and between the town and the country mills in the same section. As a rule it seems that the mills nearest Vienna have to pay the highest wages, followed by the central Bohemian mills, while mills in the more sparsely settled sections of eastern Bohemia and lower Austria get their help cheapest. Nachod, for instance, pays much smaller wages than Tannwald or Reichenberg, but living is cheaper at Nachod. From wage lists obtained at various mills it would seem that 50 cents per day might be taken as the average cotton-mill wage throughout Austria.

On account of heavy taxes most of the Austrian cotton mills are private companies. The system of management is a little different from the ordinary American custom of a superintendent, boss carder, boss spinner, and boss weaver. The superintendent is here called the technical director or manager, and under him there is an assistant manager. There are no heads of the different rooms, but instead a foreman for each group of machines. Thus, in the "Prag-Hollleschowitzer Baumwollspinnereien Leopold Mahler," at Prague, a yarn mill which operates 26,012 spindles on yarn, 900 waste spindles, and 3,048 twister spindles, there is a technical director, with one assistant for day and one for night work. Under the assistant there are the following foremen or second hands: Blow room, 1; cards, 1; fly frames, 3; ring spinning, 4; mule spinning, 4; doublers, 1; winders, 1; yarn-delivery room, 1.

WAGES IN BOHEMIAN MILLS AND WORK PERFORMED.

As a fair example of an average mill, in respect to management and wages, I give the following detailed list of a 40,000-spindle, 900-loom Bohemian mill near Reichenberg:

Picker room—per day, men, 48.7 cents; women, 34.5 cents.

Cards—1 card grinder to every 20 cards, $4.06 a week; 1 can girl, 34.5 cents a day; 1 lapman, 48.7 cents to every 12 yards; 1 cleaner, 48.7 cents a day for every 24 cards.

Draw frames—7 deliveries; paid 1.32 cents a hank for No. .13 hank sliver.

Slubbers—pay, 4.47 cents a hank for No. .50 hank roving, and 5.48 cents a hank for No. .60 hank roving; the operative makes $3.25 to $4.46 a week.

Intermediates.—Pay, 5.08 cents for 1.2 hank roving and 5.88 cents for 1.5 hank roving; make $2.84 to $3.85 a week.

Fine frames.—Tenders, 4.87, 5.08, 5.28, 5.68, 5.88, and 6.09 cents per hank for Nos. 2, 2½, 3, 3½, 4, and 4½ hank roving. The fine frame tenders make $2.48 to $5.28 a week; they usually run 1 frame, but some run 2, and these make the higher wage. On the 40-fly frames at this mill there are employed 15 helpers to lay up roving, help doff, etc., at 30 cents a day.

Ring spinning.—Each girl runs 1 frame of 450 spindles and does her own doffing. The girls of every 4 frames are supposed to work together when doffing. These spinners are paid per hank as follows: Nos. 10 to 22s, 3.41 cents; Nos. 24 to 28s, 3.65 cents; Nos. 30 to 36s, 3.84 cents; No. 40s, 4 cents; No. 44s, 4.12 cents; No. 46s, 4.30 cents.

Mule spinning.—The mules at this mill are of 568 spindles each, and 1 spinner, 1 apprentice spinner, and 1 creeler run 2 mules (1,136 spindles). They are paid per 1,000 stretches, of 66 inches per stretch, as follows:

Pincops.	Spinner.	Apprentice spinner.	Creeler.
	Cents.	*Cents.*	*Cents.*
Nos. 6 to 9	13.86	12.67	8.42
Nos. 10 to 11	12.67	11.49	7.92
Nos. 12 to 14	12.18	10.98	7.65
Nos. 15 to 22	11.69	10.47	7.41
Nos. 23 to 30	11.94	10.72	7.13
Nos. 31 to 42	12.77	11.49	6.90
Nos. 44 to 46	12.93	11.65	6.90
No. 50	13.28	12.02	6.90

EARNINGS OF THE VARIOUS OPERATIVES.

If one figures on a production, as they do here, of 5.84 hanks of No. 20s per ten hours, the spinner's wage is found to be 63 cents a day. Reelers are paid by the kilo (2.2 pounds); warpers run 1 machine each and are paid by the 100 kilos (220.46 pounds) or 1,000 meters (1,090 pounds); spoolers are paid by the day and winders by the kilo. The rate of pay is so arranged that all of these earn from 41 to 49 cents a day.

The foregoing are the actual wages paid at one Bohemian mill and except for the mule spinning wages, which are low, may be taken as a good average, though, of course, there is much variation. Draw-frame tenders, fly-frame tenders, and ring spinners are, in nearly all Austrian mills, paid by the hank. On the mules, however, it is more customary to fix a set price for the spinner per day, based on the required production, the ordinary requirement being 35 hanks of No. 20s per week, and then to pay the piecers 70 per cent of the spinners' wages, and the creelers 50 per cent. The usual mules are 900 to 1,000 spindles each, and for 2 mules, 1,800 to 2,000 spindles. Most mills require 1 spinner at $1.02, 2 piecers at 71 cents, and 2 creelers at 51 cents; this for No. 20s.

Weavers are paid sometimes by length, but oftener now by the 1,000 picks. At the foregoing mill the following are the weavers'

wages per 100 meters (109 yards) of the main varieties of cloth produced (gray cloth):

Cloth.	Width in inches.	Threads per quarter inch.	Yarn Nos.	Wages.
Plain goods	34.2	21/21	36/30	$0.75
Twills	49.6	26/13	24/11	.87
Satin	34.2	25/16	20/16	.65
Damask	34.2	24/20	36/50	1.46
Batiste	31.5	21/19	60/80	.73
Plain goods	37.4	13/13	20/22	.47

Weavers, as a rule, run 2 to 3 looms and make 61 to 81 cents a day. The majority of the looms are of English or Austrian make and of the overpick style. There are, however, quite a number of mills that use the underpick loom only, where the managers prefer them for plain goods as making better cloth. There are some Northrop looms, but they are not widely used. Several mills use the battery made at Chemnitz in preference to the Northrop. In this battery pincops can be used by being slid on a special spindle with iron base, and as most of the weavers buy only pincops this is quite a convenience. A large number of looms in Bohemia are on calico, using 36s and 42s yarn.

WAGES IN POTTSDORF AND PRAGUE MILLS AND WORK PERFORMED.

At Pottsdorf, near Vienna, in a large mill having 52,000 mule spindles and 8,000 ring spindles, I found that on No. 44s there were required, per 2 mules of 2,536 spindles, 2 spinners at $1.02, 1 piecer at 61 cents, and 1 boy creeker at 41 cents per day. At this mill the ring frames were 516 spindles each and each girl ran 1 frame, did her own doffing, and made the usual 41 cents a day. The manager of this mill said that they formerly used doffers, but that there had been of late years a scarcity of help, especially of girls, so that he had to dispense with separate doffers, even though thereby the production was slightly decreased.

At this mill there were 105 cards, and 1 lapman supplied laps for the lot. There was a line of steel bars suspended from the posts back of each row of cards, and a lap carrier holding 6 laps was suspended from rollers resting on this. The picker room was at the end of the card room, and everything conveniently arranged. One carder at 49 cents and 1 boy at 41 cents per day attended to each 12 cards, and did all the work except grinding. In front of each line of cards was suspended a 6-inch tin pipe line with a hinged cap opening at each card. These pipe lines were attached to a suction fan at the end of the room and were used to convey away all the waste. On the same floor with the cards were the draw frames, slubbers, and intermediates. The different machines were not banked together, but there was a succession of groups of 2 lines of drawing, a slubber, and an intermediate. The fine frames were all on the second floor. On the fine frames 1 woman and 1 girl ran 2 machines of 180 spindles each, and their wages averaged $2.94 each a week.

At a mill near Prague, where I found doffers employed, the spinners ran 1 frame of 450 spindles each, were required to get 38 hanks on No. 20s a week, and for this were paid $2.44 a week for day work and $3.05 for night work. For 22 frames there were 18 helpers or doffers at 32 cents for day and 41 cents for night work.

WAGES IN TYPICAL AUSTRIAN MILLS—FOOD PRICES.

I have made up the following table as showing wages and cost of living for six typical Austrian cotton mills. The table is prepared from unpublished statistics given me by the president of the Austrian Cotton Spinners, as being actual figures recently compiled by a member of his association, and from statistics obtained personally:

Description.	Lower Austria.		Vorarlberg.		Bohemia.	
	No. 1.	No. 2.	No. 3.	No. 4.	No. 5.	No. 6.
OPERATIVES.						
Blow room:						
Head	$0.67	$0.88	$1.02	$0.75	$0.71	$1.02
Operative	.45	.40	.61	.47	.41	.57
Waste man	.45	.32	.73	.45	.45	.53
Cards:						
Head	.94	.88	1.22	.81	.71	1.22
Card grinder	.61	.49	.69	.56	.65	.71
Can men	.49	.35	.54	.46	.41	.56
Lap carrier	.45	.35	.54	.45	.41	.56
Oiler	.45	.....	.42	.45	.41	.49
Draw-frame tender	.50	.38	.42	.45	.41	.49
Fly frames:						
Head	.81	.94	1.36	.81	.71	1.32
Operative	.46	.38	.55	.45	.46	.57
Roving hands	.31	.29	.37	.37	.37	.43
Oiler	.45	.39	.47	.47	.45	.59
Ring spinning:						
Head	.81	.51	1.52	.81	.81	1.32
Spinner	.46	.31	.43	.39	.49	.49
Doffer	.35	.25	.....	.35	.....	.33
Oiler	.45	.....	.53	.45	.41	.41
Mule spinning:						
Head	.94	1.46	1.62	.81	.94	1.42
Spinner	1.09	.67	.80	.81	.61	.79
Piecer-up	.71	.47	.54	.43	.42	.51
Creeler	.47	.24	.31	.30	.31	.32
Oiler	.45	.....	.61	.45	.41	.61
Twisting:						
Operative	.....	.46	.41	.42	.....	.61
Creel hands	.....	.46	.39	.39	.....	.53
Reeling:						
Head	.88	.62	1.12	.81	.....	1.02
Reeler	.37	.62	.47	.36	.....	.57
Packer	.55	.53	.64	.56	.....	.64
Woman bundlers	.63	.53	.46	.37	.37	.53
Machine shop:						
Head	.91	1.62	1.62	1.02	.91	1.02
Machinist	.73	.81	.89	.67	.59	.89
Woodworker	.75	.59	.85	.57	.....	.71
Smith	.....	.61	.73	.....	.....	.61
Engineer or turbine minder	.51	.63	.76	.69	.61	.71
Fireman	.61	.53	.76	.65	.53	.61
Transmission tender	.45	.57	.65	.55	.49	.65
Night watchman	.54	.35	.61	.57	.49	.65
Porter	.54	.....	.53	.55	.41	.53
Average wages	.498	.416	.538	.46	.487	.586
COST OF PROVISIONS.	*Cents.*	*Cents.*	*Cents.*	*Cents.*	*Cents.*	*Cents.*
Bread (medium quality) per pound	1.9	1.9	2.9	2.8	2.7	2.6
Meat do	14.7	14.0	14.0	15.0	14.3	15.0
Flour do	3.0	3.0	3.5	3.7	3.2	3.2
Potatoes do	.7	.7	.6	.9	.8	.9
Sugar do	7.0	6.3	7.0	7.2	6.6	6.6
Coffee do	26.3	29.5	24.0	28.0	32.0	34.0
Salt do	2.6	2.4	2.2	2.1	2.6	2.6
Cheese one portion	4.1	.....	4.1	3.3	.....	.....
Milk per quart	5.6	3.2	4.2	4.2	5.1	5.3
Oil do	9.3	9.3	9.2	9.2	10.6	11.0
Beer do	5.1	6.0	7.4	7.4	7.0	7.4

The employees live very plainly. Bread, potatoes, coffee, and beer is the standard diet. Meat is high, and only indulged in sparingly on Sundays. The operatives usually have 5 snacks a day, and at Reichenberg the daily cost was figured as follows: Morning meal, at 6—coffee, 10 hellers (2.03 cents), bread, 6 hellers (1.2 cents); lunch,

at 9—bread and butter, 16 hellers (3.25 cents); dinner, at noon—fried sausage and potatoes, 20 hellers (4.1 cents), beer, 9 hellers (1.8 cents); afternoon lunch, at 4—bread and butter, 16 hellers (3.25 cents); supper, at 7—bread, potatoes, and coffee or buttermilk, 25 hellers (5.07 cents); total, 102 hellers (20.7 cents).

Some mills stop a few minutes at 9 and at 4 o'clock for the lunches, but at others the luncheon is consumed during work. Beer is the staple drink in northern Bohemia; wine is not used. In southern Austria wine is more used, and cheese also enters into the diet in preference to sausage.

BENEFITS FOR THE WORKMEN.

In Vienna a wool mill has besides the regular insurance systems, a pension fund for widows and orphans, whereby the widows get 120 kronen a year, and also some free tuition for their children. There are sick benefit institutions at a good many mills. Some mills make up the difference betweeen the sick benefit and the regular wages for one year. In some mills the management pay the workman's family full time while he is away on his six weeks' yearly tour of military duty among the reserves. In some instances when provisions are specially high the mill pays a special extra wage per month of 10 kronen per married couple and 5 kronen to single men. A few mills are introducing participation in profits. Some establishments have arrangements for leave of absence which start with three days and rises to fourteen days a year for full pay. The length of free absence with full pay is proportioned to the number of years employed.

In Bohemia especially the mill managers have made efforts to satisfy their help, partly for business reasons and partly from altruistic motives, but these efforts have not in all cases been well received, and there is more agitation among the workers there than in other parts of the Empire. One manager complained of the fact that the hands would not use baths that the mill had gone to some expense to erect in up-to-date style, and that they tried to nullify every scheme he got up for their benefit. A Government inspector reported a case where an altruistic manufacturer bought a lot of hygienic china spittoons that he hung along the walls of the mills for the use of the hands and that had running-water attachments, etc. These cost him 33 kronen each, but inside of a month in one way or another they all managed to get broken, and the manufacturer concluded that his paternal efforts in the interests of the workingman were of no avail. Some manufacturers consult with the workmen and have more success.

Most mills now have lockers for their help to keep their street clothes in, and some mills furnish working slippers for the women, so that they are protected against risk of sickness from wet shoes. In one case a factory sent three consumptive operatives to a sanatorium at the mill's expense and others to the country for a period of recuperation from sickness. Any reform in methods of work is usually resisted by the operatives, and in cases where mills have introduced such conveniences as knot tyers they had to be diplomatically inaugurated by paying a girl double wages to try the experiment, and then proving to the others the higher wages to be made by getting as much increased production as the inaugurator.

SCARCITY OF SKILLED LABOR—RENTS—OLD AGE PENSIONS.

In making up their report for the year 1906 the Government inspectors said that many of the textile districts in Bohemia needed 30 per cent more hands than they could obtain. This condition of affairs also existed up to the latter part of 1907, when the labor supply caught up with the demand, on account of a slackening up in business due to the effects of the foreign money crisis. There is an increasing demand for skilled labor, which is hard to supply, and the increased cost of living in the last two or three years has of itself forced a material increase in the wages. The cost of living has increased fully in proportion to the increased wages, so that the worker has not benefited materially. This has resulted in the increased establishment of canteens, factory kitchens, and soup establishments. Meat is very high, and there have been efforts to substitute sea fishes. The emigration movement is one factor that has contributed to the dearth of labor, and it may be noted that employment agencies also act as emigration agencies. Just at present this labor scarcity is not so seriously felt, but it will again become a problem demanding attention as soon as business picks up.

The labor problem is also affected by the scarcity of laborers' dwellings, and rents are high in proportion to wages. Because of this fact basements are used as habitations in many towns. The mills have built a good many tenement houses in the last year, especially girls' and bachelors' homes. Workmen's buildings are also being put up by municipalities and by building companies in order to relieve the house famine. Trieste has recently put up some municipal buildings for laborers. One building contains rooms for 32 families, of which 28 consist of one room and the kitchen, and four only of one large room with range, and every flat has its own closet. The rent for the two rooms amounts to 21.5 to 25.5 kronen a month, and for the single room 14.5 kronen a month. The taxes amount to 3 per cent of the rent, and water consumption costs 2 kronen a month. In Prague the Society for Laborers' Dwellings has done a good work in putting up workmen's houses, and in providing for several hundred families. Each habitation consists of one room, one kitchen, and one hall. Some have gardens, and the prices range from 161 to 223 kronen a year ($32 to $45).

The housing conditions in Austria as a whole can not be said to be good, owing to the scarcity of dwellings and the high rents, crowding to many families into a house and too many persons into a room, with all its attendant consequences, but the habitation conditions seem to be improving yearly and both mills and municipalities are working in this direction.

The Government has no old age or invalid pension system, as in Germany, though efforts are being made to get the system established. Several mills, however, have instituted such systems for their own factories, and also have a graduated pension system which is arranged so that full wages are paid after forty years' service.

SHORTER HOURS OF LABOR—CONDITIONS AT VORARLBERG.

In most cases the working time in the mills has sunk below the legal limit of eleven hours. The movement for shorter hours goes on incessantly, especially in lower Austria and Vorarlberg, as well as in the districts of Reichenberg and Königgätz in Bohemia, and Brunn in

Moravia, where such movements have been successful and mills now run ten and a half and ten hours and many run only fifty-nine hours or less per week. The inspector of one province reports that the introduction of ten hours in the mills in his province did not result in increased production. I was informed by a manufacturer who tried it at his mill that he found the same result at first, but as soon as the novelty wore off he found he was not getting any more production per hour than before, so he lost in proportion to the reduction in time. Sunday labor in Austria is prohibited. To work at night or overtime textile factories have to get permission of the Government.

Most mills now have kindergartens where small children can be left while their parents are at work. The charge for this is very small. Mills pay off weekly, fortnightly, or occasionally monthly. In some cases mills have arrangements with certain shops and purchases made by hands are deducted by mills, but most mills decline to do this. Formerly the mills stopped one and one-half hours for lunch, but the tendency now seems to be to stop only one hour and get out that much sooner in the evening.

Vorarlberg is quite a textile center for embroidery and for cotton mills making yarn and cloth to be used in the embroidery business. During the prosperous times in 1906 and part of 1907 many embroidery works ran far into the night and many of them worked double shifts. Laborers had to be brought from Lower Austria, the Tyrol, and Styria, but this was unsatisfactory, as they were hard to accustom to the different conditions, especially to the higher cost of living. Others imported Italians, Croatians, and Bohemians. Quite a large number of workmen's houses had to be established. One mill built houses containing five perfectly separated divisions, each division containing three families, so there were 15 families to a house. Along the back of the building were truck farms belonging to the building. The monthly rent for two rooms and kitchen, garden, etc., lighting included, was 12 kronen or $2.44. One large manufacturer left in his will a sum for an endowment fund so that laborers who married after four years should get a marriage portion.

SALES AGREEMENTS.

TRADE REGULATIONS GOVERNING TRANSACTIONS—APPLICATION TO COTTON WASTE, YARN, AND CLOTH.

The following are the rules adopted by the Vienna Cotton Exchange and by the Austrian Cotton Manufacturers Association for the sale of cotton waste, yarn, and cloth, and show the terms and conditions of sale generally accepted by the Austrian trade:

Cotton waste is bought and sold in the home trade and on the Vienna Exchange either according to spinning kind or according to sample. The principal kinds are the following:

Spinnereifäden (spinning threads).
Webereifäden (weaving threads).
Walzenputs (cylinder strips).
Deckelwolle (flat strips).
Kratsstaub (clearer laps).
Durchschlag (picker-room waste).
Spinnflug (spinning fly).
Haspelkericht (reel-room sweepings).
Spinnereikericht (spinning sweepings).
Mischlinge (mixed waste).
Aufgelöste faden (reworked thread waste).

The price is understood to be per 100 kilos net. The bales in general weigh one-half to one and one-half metercentner (110 to 330 pounds). The tare is deducted from the gross weight of the bales as the actual tare. The packing (sack) is paid for extra by the buyer. In the absence of other explicit conditions the price is understood as cash on receipt of goods, without discount.

Foreign cotton waste is sold according to sample. The following are the principal countries and kinds: United States, linters; Egypt, afrit and mako scart; France, peigneuse and batteur; England, willow fly, stockings, blowings, clearers, and combers. The terms of sale for the direct trade with the United States and Egypt are, as regards weight, tare, price basis, etc., the same as for cotton. The terms of delivery from France are payments in thirty days with 2 per cent discount. The trade with England is according to the rules of the Manchester Exchange for twist, also 4 per cent tare.

The foregoing terms, both for the home and foreign trade, are considered as binding unless there is explicit agreement otherwise:

RULES AS TO COTTON YARN.

Paragraph 1.—Cotton yarn shall be dealt in so long as there is no legal restriction in regard to the same, either by the kilo or by the English pound, or by the bundle of 2.24 or 4.48 kilos. Single bundles in the gray—that is, not bleached or dyed—must weigh without strings or covering 2.24 kilos, and, similarly, a double bundle must weigh 4.48 kilos. In a single bundle there must be five times as many skeins as the number of the hank; in a double bundle ten times as many. Every skein must consist of seven leas. Every lea should average 80 threads, and every thread should be 1.37 meters long.

Gray single cotton yarns, according to the decisions of the international yarn numbering congress now in force, must not have more than $8\frac{1}{2}$ per cent moisture. The yarns are weighed on scales connected with a drying apparatus and dried at a heat of 105 to 110° centigrade (221 to 230° Fahrenheit) up to the weight constancy. The trade weight of the yarn is figured from the dry weight by the addition of the admissible moisture contents of $8\frac{1}{2}$ per cent. This percentage corresponds, regarding the normal condition of the yarn, to moisture contents of $7\frac{7}{9}$ per cent.

Paragraph 2.—In the case of bundle yarn, where there is not the correct number of lea bands or length of skeins as above, it can, within four weeks of the delivery of the yarn, be left at the disposal of the seller, if no other arrangement was made at the time of sale.

Paragraph 3.—Claims in regard to weight and differences in yarn numbers, also for too large moisture, are to be made within fourteen days of the transfer of the yarn. Claims in regard to the quality of bundle yarn must be made within fourteen days; in regard to cops within six weeks; after this period no claim can lie. Claims in regard to excessive packing weight must be made within six weeks after receipt of the yarn. Regarding yarn to be sent to another place, the day entered on the bill of lading or waybill is to be considered as the commencing day from which the claim must date.

PROCEEDINGS FOR ARBITRATION.

Paragraph 4.—In cases of claims arising, where buyer and seller have not previously come to a definite agreement as to a certain quantity, the buyer and seller, or the agent of the seller, are together to take from each bale at least one single or double intact bundle, but from every cop case from two different places in the case seven cops must be taken, and together with the buying samples must be laid before the court of arbitration. This collection of samples must take place within fourteen days of the date of claim. Should the seller not comply with the necessary regulations respecting this collection of samples the buyer has the right to take the samples with the assistance of the secretary of the court of arbitration, or of a notary of the same, and he can do this within the following three days. In sampling for the purpose of a moisture test the following will be observed: The samples can only be taken from complete and intact cases which have not previously been opened. Every quality and yarn number must be represented. In lots under five cases two cases are to be sampled; in larger lots one case in every five. Single cases can not be accepted for condition test. The cases of cop yarn selected for sampling are to be weighed and the net weight to be given exactly to the tenth of a kilo. The samples of approximately one-half kilo are to be taken from the inside of the case and to be packed free of light. Of the selected yarn bales a single or double bundle is to be taken out of the middle of the same and to be packed so as to be protected as much as possible from outside influences.

The selected samples, packed as stated and with the seal of both parties affixed, are to be sent by first post to a recognized condition testing house of the Austrian Cotton Manufacturers' Association or to the Vienna Cotton Exchange. With every sample must be given the marks and numbers of the case, amount of invoice, and the net weight. By desire of the buyer or seller duplicate samples can be taken and carefully preserved. Sampling for the purpose of ascertaining the packing allowance must be in a manner according to instructions in paragraphs 1 to 3. From two places in every case some cops must be taken, at least 100 cops per yarn number and kinds—pin cops or warp cops. These samples are to be well packed and sent to the Vienna Silk and Wool Drying Institute or to one of the conditioning houses of the Vienna Cotton Exchange. These houses fix the total weight of the cops, including packing, as well as the weight of the empty cases and packing to the tenth of a gram exactly. All costs of the fixing of the tare, together with any traveling expenses, are to be borne by the party who loses.

Paragraph 5.—Should bundle yarn not reach the normal weight and the difference not amount to 4 per cent the buyer must take the yarn against compensation of the difference in weight. Should this weight difference, however, exceed 4 per cent, the buyer can either demand compensation for the difference or the exact weight to be delivered within four weeks, or he can reject the yarn against payment of all expenses on all the transactions. The annulling of the transaction by a buyer is, however, only allowed when the seller does not agree to deliver, within three days after receipt of the threat to annul, the full weight of the yarn demanded to replace.

Paragraph 6.—The "number" of single gray cotton yarns corresponds to the number of hanks which are contained in an English pound under normal rates of moisture. The number is to be ascertained as follows: In the case of bundle yarns the sample skeins are to be weighed together in sections of five or ten skeins; in the case of cops in lots of twice seven cops, and an entire hank is to be reeled off and weighed at the same time. The average of the numbers so obtained is regarded as the number of the yarns in the respective bales or

cases in question. In case the numbers are rejected all existing cases or bales have to undergo numbering, and the result thus reached is regarded as the average of the numbers for the whole quantity of the rejected yarn shipment which had to undergo sample drawing. Excluded from this averaging, however, are those bales or cases which are found to be under the number to be shipped, as follows: By more than 7 per cent for numbers up to 14s, inclusive; by more than 6 per cent for 14s to 24s; by more than 5 per cent for numbers over 24s. These bales are to be set aside and can be returned by the consignee to the seller on compensation of all his charges. On finer yarns there is no compensation.

The limit in which there is no compensation as to gray numbers is fixed at 3 per cent. If the difference in numbers is averaging more than 3 per cent in yarns up to 24s, inclusive, then the difference above 3 per cent, or in the case of numbers over 24s, the difference above 2 per cent, is to be compensated according to the additional weight of yarn that has to be consumed in manufacturing. The seller, however, does not have to pay compensation if within the time of shipment stipulated on he exchanges without charges correctly numbered yarns for those rejected, provided the same are as yet unmanufactured into cloth. In case there is a refusal on the part of the consignee to accept the yarn, either on account of too coarse or too fine numbering, the seller has the right to ship, within a fortnight after the end of the shipping term agreed upon, or within a fortnight after the sample drawing is made, correctly assorted yarns in substitution.

Should a difference of numbers be stated at the time the yarns are tested for moisture, which the consignee or the seller can request, in that case a refusal can take place on either one of the two grounds; besides the samples selected for condition test a single or double bundle is to be selected from each bale for number testing, or in the case of cops twice seven cops from each case and the number is to be at once, at the place, fixed by the consignee and the seller or their representatives.

In case there are objections against the correctness of the testing instruments employed (reel and yarn scales), or against the manner of testing, and an agreement is not possible, the decision comes to the court of arbitration. The number agreed upon or decided by the court of arbitration is to be announced to the condition testing institute, which has to state the real number with due regard to the contents of moisture ascertained in case the limit of moisture of 8½ per cent, as given in paragraph 2, is exceeded, and to announce it to the consignee and the seller.

IN LIEU OF SPECIAL AGREEMENTS.

Paragraph 7.—Where there are no special agreements the following shall be understood in regard to cop shell weight: The weight of the paper tubes of warp cops shall not exceed 1.25 per cent and of pin cops 2.25 per cent of the full cop weight (weight of yarn and tube). Owing to the fact that small deviations are unavoidable, the seller can claim excess paper shell tare only when the shell weight, as ascertained according to the last section of paragraph 4, is more than 1.4 per cent of the gross weight for warp cops or more than 2.5 per cent for pin cops, respectively. In case the shells weigh more than 1.4 per cent or 2.5 per cent, respectively, of the gross weight the seller is liable to compensate the consignee for the difference between the shell weight of 1.25 per cent and 2.25 per cent, respectively, and the one actually ascertained and to deduct from the invoice at full yarn value. For throstle crops and other warp cops on bobbins the seller has to compensate the consignee the full bobbin rate less 1.5 per cent, or in the case of pin cops or bobbins the full shell rate deducting 2.5 per cent of the yarn weight (weight of the yarn without shells) at full yarn price. The foregoing regulations do not apply to yarn in stocking yarn twist or to cases in which the consignee stipulates on shipment of a special cop shape.

Paragraph 8.—The condition tests of yarns are made exclusively by the conditioning houses, which are publicly established by the Austrian Cotton Manufacturers' Association or by the Vienna Goods Exchange, the heads of which must be taken on oath according to the regulations prescribed in these organizations. The results of condition tests are to be announced to the consignees, as well as to the seller directly by the conditioning institute. The institute which is to test the yarn for moisture is to be selected before the samples are taken, and by the consignee. Within three days after receipt of the decision on the conditioning either party has the right to claim a second condition test, provided

duplicate samples were drawn. The appointment of the institute for the second conditioning test is for the seller. In accordance with the results of the samples drawn as per paragraph 4, as well as for the statements on the net weight invoiced and charged, the conditioning institute has to state whether there is for the consignee damage by too great an amount of moisture in the yarns, and to what this damage amounts to in percentage. The average of all samples sent in to be tested for moisture is regarded as an average of all the lots rejected without regard to whether or not before sampling a part of the yarn was already manufactured into cloth. In cases, however, where the series is no more complete, the number of cases stated in paragraph 4 must have been sampled, or else the condition test can only be regarded as applying to the quantity existing. In case of a double conditioning test the average of the two tests is authoritative. All charges of the tests, including all eventual traveling expenses, must be paid by the losing party.

COMPENSATION FOR REJECTED YARN.

Paragraph 9.—In case of yarn rejected on account of quality, the court of arbitration has to decide whether or not for the yarn rejected by the consignee another corresponding to the sample or to the sense of the contract is to be shipped by the seller, whether the consignee has to take the yarn on compensation of the loss due to quality, how great the quality damage is, and, finally, whether the contract is to be regarded as void. For quality differences of cotton yarns which are not bought by sample, but by label, mark, or by the denominations of certain manufacturers named specifically before the transaction, the seller is liable to the consignee only inasmuch as the latter can show that the yarn shipped varies materially from the quality of the labels, marks, or denominations in question as it was during the twelve months preceding the contract.

When yarns are sold by samples the buying sample is to be labeled with the date and sealed or stamped by the seller, and is to be given to the buyer in a manner which precludes the confounding or exchanging of same. In all cases where the court of arbitration decides upon the return of the goods the seller has to compensate all charges connected therewith and the damage done to the consignee by the dissolution of the contract in conformity with article 47 of the general conditions for the trade in goods on the Vienna Exchange.

Paragraph 10.—If no shipping time is stipulated upon when making the contract the goods are regarded as to be shipped immediately—that is, shipping can be requested and made at any time. If gradual shipping in a limited time is agreed upon shipments are to be made in almost equal monthly rates. If, however, gradual deliveries was agreed upon without stating the final time of shipping, acceptance has to take place at most in six months from the day of the contract in approximately equal monthly rates. If a contract prescribes consecutive delivery, this consecutive delivery is to be made and taken in approximately the same rates as those immediately preceding. The consignee, in the absence of other agreement, has to hand over the particulars to the seller at least four weeks before the beginning month of delivery, otherwise the latter is liable for no tardiness in delivery. If the consignee neglects to send in the particulars, notwithstanding that he has been requested to do so by a registered letter, the seller has the right to deliver the articles in question after his own wish, within the limits drawn by the contract. If the consignee neglects to give his orders of delivery within five days when also requested by registered letter, the seller has the right after the 15th of the month of delivery to send over to the consignee the wares in question or to store them in a public warehouse situated near his place of manufacture or place of business on the account and risk of the consignee.

WHEN DELIVERY IS DEEMED TO HAVE BEEN MADE.

Paragraph 11.—The seller has fulfilled his liabilities for delivery if he hands over the yarn to the consignee at the latest on the last day of the time of delivery at that place from which it was to be delivered, or if he has handed it over to the transportation company to ship. If the seller has not fulfilled his liabilities of delivery, or the consignee has not fulfilled his liabilities of acceptance, the party which has fulfilled the contract may claim the rights stated in paragraphs 47 to 55 of the general stipulations for the trade of goods on the Vienna Exchange, with the modification that the silent prolongation stipulated in paragraph 53 of the general conditions is extended to four weeks.

Paragraph 12.—The entrance of superior force (force majeur), as far as such renders impossible the delivery contracted, releases the spinner as well as the jobber from the obligation of shipping; the latter party, however, only when selling yarns by certain labels, marks, or denominations stipulated upon in advance. Strikes, epidemics at the place of manufacture, officially ascertained, and breakage of transmission appliances or machines are, under certain circumstances in their consequences in regard to liabilities of delivery, to be regarded as equivalent to superior force, and in case of controversy this is to be decided by the court of arbitration.

Paragraph 13.—Invoices are to be paid, first, (*a*) by cash with 3 per cent discount within thirty days after the date of invoice; (*b*) with bill of acceptance of six months, or acceptance of four months and 1 per cent discount from the invoice date; (*c*) on open account, five months from date of invoice. Second, if one monthly invoice is produced on all shipments in the course of one month or cash or acceptance monthly is agreed on all invoices produced in the course of a month, (*a*) cash payment has to be made up to the 20th of the month following the month of delivery; (*b*) the time of currency of the monthly acceptance begins on the last of the month of delivery; (*c*) the currency of the four months' open account begins on the last of the month of delivery, so if the consignee states in the cash business the time of payment, the amount is due at once and the cash discount ceases, but he gets 5 per cent interest for the time elapsed, calculated from the date of payment up to the close of the four months' limit. Third, if the consignee was permitted to choose between the acceptance or cash payment, or if acceptance only was stipulated upon, the acceptance is to be sent in at least by the 20th of the month following the delivery. Should the consignee omit or neglect this, especially if requested by registered letter, the amount of invoice without cash discount, a compensation of 5 per cent calculated from the date of payment up to the elapse of the four months' term, is payable at once if the acceptance is immediately sent in. Fourth, by cash payment is understood payment in cash, transmission by indorsed checks on banks, checks on postal savings banks, or other checks. Checks and indorsements must, however, be due at the time stipulated for cash payments.

Paragraph 14.—If there is no other agreement for cops of inland origin, packed in cases or boxes, 1.4 hellers per English pound or 3 hellers per kilo are to be charged for packing.

Paragraph 15.—Charges for transmission into the house, store, or to the forwarding agent of the consignee are, in Vienna, to be paid by the seller. On shipments to the provinces, charges for forwarding and transmission to the respective transportation companies are paid by the consignee.

COTTON WEAVING, GRAY GOODS.

Paragraph 1.—All goods woven from raw cotton yarns which are not yet manufactured are dealt in per meter, if there is no other agreement either by samples (pieces, strips, or cuttings) or by designation of the make-up, the yarn number, width, and approximate length of the cloth. If there is no agreement as to the length of the cuts the following lengths shall be understood: For calico, molinos, percales, etc., an approximate length of 120 meters; for printed barchent, approximately 90 meters, and for domestics and inlets, between 50 and 60 meters per piece. The make-up is designated by the number of warp and weft threads which are included in a quarter of an inch (old Viennese measure) or to a centimeter of the cloth. The width of the cloth is expressed in old Viennese inches or in centimeters.

Paragraph 2.—In the delivery of gray goods, when there is no other agreement, only cloths manufactured on mechanical looms from cotton yarns are to be understood.

Paragraph 3.—Claims for delivery not in accordance with samples or for differences as to the make-up, width, length, yarn numbers, and yarn qualities must be made by the consignee at least within a fortnight after delivery else the liability of the seller ceases. As to goods sent to another place, the date of the arrival at place of destination stated on the invoice is regarded as beginning the time of claiming.

Paragraph 4.—In examining into a claim, if the seller and consignee have not agreed upon a certain quantity, 10 per cent of the rejected goods, but not less than 10 nor more than 100 pieces, together with the actual samples, in case there are samples (sample pieces, strips, or clippings) are to be presented to the court of arbitration. Rejected pieces of not more than 10 are to be presented in full. The selection of the pieces to be judged has to be made by the

seller in common with the consignee or by their representatives within fourteen days from the day of claim. In case the seller does not do what is necessary in this connection the consignee has the right within the next following three days to have sample pieces taken from the rejected bales by the secretary of the court of arbitration or by an imperial notary public. Should the parties not agree upon the selection of the sample pieces the same are likewise to be taken by the secretary of the court of arbitration or by an imperial notary public and the average of all the samples is to be considered the average of all the existing quantities of the rejected goods.

WHERE NO SPECIAL AGREEMENT EXISTS.

Paragraph 5.—If there was no special agreement between the seller and the consignee with regard to the permissible difference in the make-up, all kinds of gray goods may be delivered as to warp as well as to weft, with full number of threads from correctly numbered yarns, but with due regard to the technically unavoidable limits of mistakes. Differences in width up to 1.5 per cent existing in not more than 10 per cent of the entire quantity does not give the consignee the right to reject the goods, but the seller is compelled to compensate the consignee for the percentage of difference in width as ascertained up to this limit. If there is a difference in width up to 1.5 per cent, no more than 5 per cent of the resulting quantity of the goods are to be taken over without right of compensation. Goods of better quality than contracted for can not be rejected, insomuch as they do not materially vary from the stipulations prescribed in the contract, but the consignee has no right to claim compensation for better goods delivered.

Differences of make-up, yarn numbers, and quality are to be decided by the court of arbitration in case of controversy. If the latter thinks that there is a difference it may nevertheless decide that the consignee has to accept the goods on compensation for the smaller value than contracted for. If the decision reads that the goods be not taken over, the consignee may nevertheless, on his own desire, accept the goods on compensation of the smaller value of the same as decided by the court of arbitration, or he may return the same to the seller on settlement of all the charges connected therewith. In the latter case the consignee has the right, first, to insist on fulfillment—that is, to request shipment of an equivalent quantity of goods as contracted for within six weeks; second, to desist from the contract by canceling the shipment in question and thereby shorten the whole contract; or, third, to request compensation for the damages that can be shown.

If the consignee wishes to desist from the contract or to request compensation for loss on account of nonfulfillment, he must announce it to the seller, leaving a proper time, which should be decided by the court of arbitration in case of controversy, for delivery of goods as contracted for. If this time for later delivery has elapsed without result, or if the compensatory delivery does not fall within the contract, then the contract is considered void and the seller becomes liable for compensation of damages. In case of cancellation of the contract the liability for damage can not, if the contract was to be fulfilled in several sections of time, be referred either to the shipments formerly properly fulfilled or to those due later on.

DIFFERENCES IN WEIGHT AND QUALITY—DELIVERY.

Paragraph 6.—On contracts where the weight per piece is stipulated, on differences of weight up to 3 per cent over or under the limits stipulated, can not be considered grounds for rejection, and no compensation whatever is to be paid by either party.

Paragraph 7.—On contracts which are not made by sample, but on the regular brand of the seller, or by the denomination of certain manufacturers specially named before contracting, the seller is liable to the consignee for differences of quality only inasmuch as the latter can show that the goods delivered materially differ from the quality as it was averaging during the last six months preceding the contract.

Paragraph 8.—On contracts by samples the buying sample labeled with the date and sealed or stamped by the seller in a manner precluding confounding or exchanging is to be given to the consignee to file.

Paragraph 9.—In case there is no certain term of delivery agreed on when contracting, the goods are considered to be delivered at once—that is, fulfillment can be requested and made at once. If gradual delivery within a certain

time was agreed on, delivery has to take place in approximately equal monthly parts. If gradual delivery was agreed on without indicating the final time, delivery has to take place at most within six months from the date of contract in approximately equal monthly parts. If the contract is for consecutive delivery this contract is to be fulfilled and accepted in approximately equal periods as that immediately preceding it.

Paragraph 10.—In case there is no other agreement the seller on time contracts has fulfilled his contract as to deliveries if he has delivered the goods not later than the last day of the term of delivery, at that place from which they were to be delivered into the hands of the consignee, or to the transportation company or forwarding agent. If the seller has not fulfilled his liabilities of delivery or the purchaser has not fulfilled his liabilities of acceptance the party which has fulfilled the contract is protected by the rights given in paragraph 47 of the general goods trade rules of the Vienna Exchange.

If a contractor desires to cancel the quantity not delivered or accepted, respectively, or to claim damages, he has to inform the other party by registered letter, and is compelled to allow the tardy party proper time of prolongation if no exactly determined time of delivery was agreed upon and if the nature of the contracts permit so to do. If on time contracts, after a lapse of the delivery time agreed upon, a part of the quantity contracted for has not been delivered or accepted, respectively, because neither the seller insisted upon acceptance of the goods nor the consignee required shipment, a silent prolongation takes place, and the rest of the contract in regard to quantity and time is to be fulfilled with shipments averaged in the same way.

TARDY SHIPMENTS—COST OF DELIVERY.

Paragraph 11.—If a contract has been made for certain time of delivery, but with open particulars, the purchaser in the absence of other agreement has to mail the particulars to the seller at least eight weeks before the beginning of the month in which the term of delivery in question is ended, otherwise the latter is liable for no tardiness in shipment. In case of tardy shipments the seller has the right to fix the time of fulfillment of the invoice corresponding to the time of delivery originally contracted for. If the purchaser omits to send off the particulars in time, although specially requested so to do, the seller has the right to fulfill the contract in any make-up, width, and yarn quality which corresponds to the price basis of the cloth. If no price basis has been agreed upon, but the prices for the different kinds have been agreed upon, and the buyer, in spite of the demands from the shipper for particulars in regard to the amounts to be delivered of the various kinds, fails to comply, the shipper has the right to deliver the quantities of the various kinds ordered according to his own wishes.

Paragraph 12.—In so far as superior force makes the contracted deliveries impossible this relieves the seller and the manufacturer and also the seller of foreign products from the necessity of delivery, but the latter only insomuch as it is a question as to the delivery of goods made in the factory of the particular manufacturer mentioned. In how far strikes, epidemics, officially ascertained, or breakdown of machinery or of transmission appliances have action upon the necessity of delivery is, in case of controversy, a question for the court of arbitration.

Paragraph 13.—If nothing else has been agreed upon for delivery of gray goods, six months' time is understood as the usual conditions against acceptance, from the date of invoice or cash, with a 3 per cent discount within fourteen days from the date of invoice. Settlement is to be made at the domicile of the seller.

Paragraph 14.—The cost of delivery of gray goods into the house, warehouse, or to the forwarding agent of the buyer in Vienna, on the Vienna Plaza, must be borne by the seller. In case of shipment of goods to the provinces the costs of delivery of forwarding is to be settled by the buyer.

REPORTS FROM CONSULAR OFFICERS.

CARLSBAD.

EXTENSIVE COTTAGE INDUSTRIES IN THE DISTRICTS OF BOHEMIA.

Consul John Steel Twells, in the following report from Carlsbad, minutely describes the cottage industrial life in that part of Austria, so many of the products of which are sold in the United States:

In the manufacturing districts of Bohemia goods for both home supply and exportation are not only produced in factories, but to a great extent the raw material is given to men, women, and children and taken home, where all members of the family engage in the work of producing various articles which are sold to the home trade or exported to the foreign countries.

This method is known in Austria as "Hausindustrie," or home work, and in all parts of the country where textiles, glass, lace goods, gloves, etc., are made, men, women, and children obtain their simple living by this means, and consequently it is of great importance to thousands of poor people living in the small villages adjacent to factory centers, enabling them to make a living, especially during the long dreary months of winter, when no other occupation is possible. Around perhaps the only table in the only room, in a little house, the family assemble, the man, his wife, the grandparents, and children with other members of the family, if there be any. When evening comes on, an oil lamp, a candle, or even chips of wood are the only lights by which they can work. On Thursdays, Fridays, and Saturdays the finished articles are taken to the factories and paid for.

"It is very hard now," said one of the lace exporters from Neudek the other day, "to get people in summer to make laces. They prefer to go to work in fields or picking hops, for which they get higher wages than by making laces. Children get 8 cents a day at that time and adults from 25 cents to even 40 cents, and of course we can not afford to pay such high wages for lace making."

GOVERNMENT INTEREST IN IMPROVEMENT.

The Austrian Government, desirous of improving this sad condition of laborers, is at present preparing a new law which has been handed to the chambers of commerce for their consideration and judgment. The following gives the numbers of persons in Bohemia who do home work:

Aussig	667	Leipa (cloth, linen)	3,916
Braunau (linen)	4,786	Leitmeritz	210
Dauba	54	Reichenberg	2,256
Deutsch Gabel (weavers)	4,695	Rumburg (weavers)	7,819
Friedland	498	Senftenberg (textile, linen)	10,054
Gablonz (glass beads and cheap jewelry)	9,147	Teplitz	1,378
Hohenelbe (textile)	2,514	Tetschen (buttons, linen)	3,068
Koeniggraetz	1,182	Trautenau (linen)	4,936

In the district of the Chamber of Commerce, in which parts of the consular districts of Reichenberg, Carlsbad, and Prague are situated, 105,897 persons do such home work as has been described. They constitute more than one-fourth of the entire population of that commercial district. In the Reichenberg section 68,649 persons are engaged in home work, i. e., outside the factories. They make mostly textile goods, but also embroidered, knitted, worsted, and crocheted goods, which are more or less dependent upon the textile trade.

Next comes glass, stone, earthen ware and clay goods, in which 16,596 are engaged; three-fourths of these workers belong to the glass trade, which is one of the oldest home industries of Bohemia; 8,168 persons make stays, gloves, head covers (caps, hats), and 8,168 do cleaning work at home; 6,427 make wooden, matted, turned, and carved goods; and 3,320 metal goods, chiefly metal turners. In the Erzgebirge, which belongs to the consular district of Carlsbad, 6,000 persons are engaged outside the factories with straw and bast platting. The raw material—simple wheat straw—comes from the hop district of Saaz, while bast or wooden chips are made from Russian ebony wood.

NUMEROUS ARTICLES OF PRODUCTION.

In the district of Senftenberg are located the basket makers and the reed twisters. Mats, pockets, and slippers are made of reed, rush, etc., which are likewise used for building purposes, especially for reed mats, and articles for smokers (cigarette and cigar holders, etc.). In northern Bohemia and also in some southern parts of Bohemia, as in the districts of Muenchengraetz, Neupaka, and Senftenberg, are the shoemakers' villages and towns, mostly inhabited by workers who make parts of shoes at home for the wholesale makers.

Their goods are called "market goods," because they are exhibited and sold on stands at the fairs in the larger manufacturing districts which are held every week or month, or several times in the year, especially in the districts of Bohmisch-Kamnitz, and at Bensen, Tetschen, and Schluckenau. Wooden slippers are made in the district of Rumburg; braces at Teplitz; gloves at Bilin, Kaaden, and at Prague, also at Joachimstal and Abertham. At Schoenau and Hainspach (district of Schluckenau) the ribbon weavers are located, and in a southwestern direction from Rumburg are the wood weavers or makers of Sparterie goods, while at Rumburg and Bohmisch-Kamnitz are the smoking-pipe makers.

In many of the forest villages barrels are made, which trade is largely encouraged by the chemical factories at Aussig, that employ several thousand workmen. In the southwestern districts of the Boehmerwald are many hundred makers of chip boxes; they make also agricultural and kitchen goods of wood, frames for brushes, toothpicks, and wood carved goods. Altogether about 3,000 makers of wooden goods are scattered in the various villages of southern and northern Bohemia.

CONFORMING TO CHANGING DEMANDS.

Other kinds of home work depend upon the factories near the villages. In the Riesengebirge paper bags and horn or stone buttons are made; near Reichenau and Gablonz snuffboxes were formerly made, but when the use of snuff decreased a new trade began, viz, the mak-

ing of cheap oil paintings on wood, tin, and linen. This developed from the little paintings which were formerly made on the snuff-boxes; the paintings were enlarged and the new industry of making oil paintings was started. The emigration to the United States from Bohemia is partly connected with this kind of work. If the market is good, then all the family works day and night and makes a living, but if the market is bad, they lose their employment and lead a very poor life. The wages are extremely low. In the Adlerhills weekly wages of $1 to $1.20 are paid, but as there are many weeks during the year when no work can be had the average weekly earnings are not larger than 80 cents. In good times husband and wife work alternately eighteen hours a day. If the scanty habitations, the rough climate, and the poor soil are taken into consideration, some idea can be gained of how great is the poverty in these mountain villages. Yet it is considered of great value that chip-box making has been introduced, because the workers, mostly women and children, earn 80 cents to $1.40 per week; and linen-shirt buttons are now made, by which wages of 60 cents to 80 cents a week are earned. Weavers who make at home silk and Jacquard and art work earn $1.40 to $4 a week. The straw and bast matters earn from 20 to 40 cents a day, but after the "season" the wages are lowered. Wood carvers earn $1.20 to $2.80 a week, and the brush makers at Gabel from $1.60 to $2 a week. The wood carvers at the Wittigtal earn $1.60 to $3.60 a week, and the wood and mat makers at Niemes from $1.20 to $1.60 a week.

INCREASING INCOME—ADJUSTMENT OF INDUSTRIAL RELATIONS.

In this consular district home work is often done to increase the income. People go to work during daytime and in the evening they spend their time by making certain goods. The artificial-flower makers earn $1 to $2.40 a week. At Prague and Joachimstal, Abertham, etc., in the consular district of Carlsbad, gloves are made. The manufacturers hand the leather out to contractors called "Natfaktoren," who distribute the work among the people. Hundreds of women are thus employed in this district who earn $1.20 to $1.60 a week. There are other female home makers of straps, whip makers, cutters of visors for caps, and umbrella makers.

To many thousands of persons home work gives employment. There are districts in which the population lives entirely from this kind of work, and although they make a poor living it is a benefit to them. On the other hand, it must be admitted that home work strongly competes with the smaller manufacturing trades. In Vienna, for instance, there are 100,000 to 120,000 home workers making shoes for factories. There are three classes, viz: (1) Masters who work with assistants; (2) journeymen who work for weekly wages and take on assistant hands, the latter getting food and lodging and very small wages, and (3) "Pfuschers" who work without assistants.

The difficulty with which the Austrian Government has to cope is that the small trades people have great difficulty to compete with home work. Many thousands of both classes make an honest living, but one class is pressing the other, and now the Austrian Government is studying a problem to regulate home work in such a way that it will no longer affect the small manufacturing trades.

PRAGUE.

INCREASE IN SPINDLES, LOOMS, AND MACHINERY IN RECENT YEARS.

Replying to an inquiry, Vice-Consul Arnold Weissberger, of Prague, furnishes the following information concerning the textile industry of Bohemia:

There has been an increase of about 700,000 spindles and 20,000 looms in the cotton industry of Bohemia during recent years. There was also large additions of machinery last year, but the extent is yet impossible to obtain.

With the exception of auxiliary hands, all cotton-mill operatives are paid by contract, and their daily wages average as follows:

Class of workers.	Wages.	Class of workers.	Wages.
Spinner, male	$0.80	Weaver, male	$0.40
Piecer, do	.50	Piecer, female	.44
Drawing-frame attendant, female	.45	Warper, do	.44
Auxiliary employees	.50	Bobbin-machine attendant	.40
Throstler, female	.48	Overseers	1.00

The hours of labor are generally ten per day. Some spinning mills are working day and night, with double shifts of employees, of ten hours each shift.

It is difficult to obtain general information regarding the housing of operatives. In some dwellings the rooming space costs from 50 to 60 cents per square yard, or from $12 to $16 per room per year. As a rule, the operatives are crowded into small places, say 8 or 9 persons to about 30 square yards. In the country the dwellings are rather cheaper. The style of living depends chiefly on the number of breadwinners in a single family and their income. In the mountain districts the majority of the operatives live on coffee and potatoes chiefly, but in the city and in the open country living conditions are somewhat better.

MILL OPERATIVES AND MACHINERY.

In weaving mills one operative tends 3 looms on plain cotton goods, 2 looms on fancy goods, and 1 loom on heavy goods. In isolated cases, when mills are fitted up with Northrop looms, a weaver and one assistant tend 12 looms. These looms have found as little favor as the various English self-acting looms. In the spinning department each machine is tended by one operative, and in the warping department one operative tends from 12 to 15 spindles.

In spinning mills with self-acting machines four operatives are put down to 2,000 spindles, with flyers one operative to 300 spindles, and with throstle frames one operative to 500 spindles.

In the spinning mills English machines are generally used, although some mills are fitted with Alsatian machines. The only machines built in Austria are those for waste spinning. In the weaving mills the power looms are mostly Austrian manufacture, but many English looms are in use. The sizing engines are chiefly English, but a few Alsatian machines are in use. The warping machines are English.

As to speed of machinery, it is estimated that small cotton looms make 180 to 190 revolutions per minute, broad, smooth looms about 160, and Jacquard looms 140 to 150. [Samples of textiles from Prague are on exhibit at the Bureau of Manufactures.]

REICHENBERG.

WAGES IN A KNITTING, LINEN, AND WOOLEN MILL.

Consul Charles B. Harris furnishes the following information concerning the wages paid in the leading textile industry of Reichenberg. The table shows wages paid overseers and operatives in the north Bohemian textile mill:

Operatives.	Weekly wages.	Operatives.	Weekly wages.
Woolen blankets and carpets:		Woolen and half woolen ladies' cloth:	
Mechanical and hand weavers—		Male	$5.07
Overseers	$6.00 to $7.10	Female	2.03
Operatives—			
Male	2.23 to 6.29	Cotton and woolen knitting:	
Female	2,23 to 4.06	Male	$2.40 to 3.00
Finishers	4.26 to 5.28	Female	1.80 to 2.40
Spinner's assistants—		Piecework—	
Male	2.03 to 5.98	Male	3.00 to 4.80
Female	1.82 to 3.65	Female	2.76 to 3.00
Draftsmen—		Linen department:	
Male	3.65 to 7.10	Male	2.04 to 3.60
Female	3.65 to 4.26	Female	2.16 to 2.40
Operators under ninteen years—		Piecework—	
Male	1.01 to 2.82	Male	3.00 to 4.80
Female	1.01 to 2.43	Female	2.16 to 3.00

Payment of wages is made each Saturday. The mode of payment generally in vogue is by pay roll of 10 or 12 names. The total amount, with the pay roll, is handed to the overseer, who pays each operative the amount set opposite his name. A few factories use the envelope system, while at other factories the operatives call at the office for their wages. The hours of labor are ten.

Manufacturers are compelled by law to insure their employees against accident and sickness. [Samples of Bohemian textiles transmitted by Consul Harris can be seen at the Bureau of Manufactures.]

HUNGARY

COTTON FACTORIES.

INDUCEMENTS TO ESTABLISH MILLS—INCREASING SPINDLAGE—PRESENT CONDITIONS IN THE INDUSTRY.

Cotton manufacturing in Hungary is as yet in its infancy, but it is interesting to note the great inducements offered by the Government to accelerate its growth. For patriotic reasons the people wish to be at least economically independent of Austria and are sparing no pains to foster home industries.

Rozsahegy (German name Rosenberg), in the northern part of Hungary, is so far the main cotton manufacturing center and contains about half the cotton spindles. This industry is succeeding to the hand-loom weaving that was formerly established in this district by Saxons. Besides Rozsahegy the mill towns are Budapest, Dugaresa, near Trieste, and Rozsony, which lies just across the border near Vienna. The largest company is the "Ungarische Textilindustrie Aktiengesellschaft," which was founded at Rozsahegy in 1894, and now has two spinning mills of 50,000 and 54,000 spindles, respectively, or a total of 104,000 spinning spindles, 7,000 twister spindles, 1,250 ordinary looms, and 900 Northrop looms. These latter were made at Rozsahegy under the patent bought from the Draper Company. The next largest company is the "Ungarische Baumwoll Industrie Aktiengesellschaft," or, as it is known by Hungarians, the "Magyar Pamutipar R. T.," at Budapest, which has 13,792 spindles and 340 looms.

The present (January, 1908) status of the Hungarian cotton manufacturing industry is furnished to me by the Hungarian Department of Commerce as follows:

Description.	Number.	Spindles.	Looms.
Spinning mills only	2	65,120	
Spinning and weaving mills	3	85,040	2,126
Weave mills only	14		2,953
Thread mills	3	20,000	
Waste spinning mills	1	1,300	
Total	23	171,460	5,079

The present consumption of cotton is about 50,000 bales a year. As yet the mills are mainly on coarse goods, Cabots and some colored goods. The ones that make finer goods have to send the cloth to Bohemia to be bleached.

SKILLED HELP OBTAINED FROM AUSTRIA.

The Hungarian mills suffer from the disadvantage of starting in a new section and away from the various machine shops, yarn agencies, bleacheries, and the allied industries that gather around mill centers. The Hungarian operative is also inferior to the Austrian, as he is unaccustomed to machinery. For this reason the mills are forced to import Austrians for the more skilled positions, and these are obtained from the mills just over the border by offering special inducements, such as higher wages, free transportation, etc. This borrowing of their operatives is not relished by the Austrian mills, but they can not help themselves. Even with the help of a partial force of Austrians the Hungarian mills find it difficult to get results equal to those of Austrian mills. The mills at Budapest have the advantage of cheap water communication down the Danube with Turkey and the Balkans, but otherwise the new cotton mills need all the concessions granted them by the Government to enable them to succeed.

The help question is one of the most important, and not only the cotton mills but the great flour mills and other Hungarian industries are beginning to feel the drain caused by the departure of so many emigrants to America. Just at present, on account of the money crisis in America, there has been a return tide of the floating class, but most of these will return to America as early as conditions permit. One mill manager referring to such returned workers said that they had been spoiled by the American life; that before they left they were tractable workers, and recognized that the man who paid them was their superior, but that now they regarded themselves as fully equal to anyone and were very hard to manage.

ENGLISH MACHINERY USED—THE WAGES PAID.

Most of the Hungarian mills use English machinery and are one-story mills. The Magyar Pamutipar mill at Budapest is a good type of the new mills now being started in Hungary. This mill has 13,392 spindles and 340 looms, but is being enlarged to 30,000 spindles and 500 looms. The mill is one-story with posts made up of two iron channel beams placed back to back, has the usual cement floors, and saw-tooth roof throughout. This mill mixed sawdust with the cement so as to make a floor with a little more "give" in it, and one that would not be so cold for the help to stand on. Most of the machinery is from England, but some is from Germany, while the boilers and engines were made in Budapest. The looms are the overpick type and the spinning frames have the English system of top rolls. Cloth is measured in centimeters, but, as is the case in Italy, Switzerland, and Austria, the yarn numbering is on the English system and the clocks on the speeders, etc., read in English hanks of 840 yards. The wages paid at this mill are as follows:

Picker hands: Men, 2 crowns (crown=20.3 cents); women, 1.5 crowns a day.
Cards: 2.6 crowns (8 cards to a man); card grinder, 4 crowns.
Draw frames: 1.5 crowns on the average, paid by hank clock.
Slubbers: 2 crowns a day average, paid by hank.
Mules: Two mules (2,000 spindles) on No. 20s require 1 spinner, at 5 crowns; 2 piecers, at 3.50 crowns, and 2 boys, at 2.50 crowns.
Ring spinning: Girls run one side of 200 spindles each, get off about 8 hanks a day, and are paid 1.2 crowns to 1.4 crowns a day; they do their own doffing.

Reelers are paid by the pound and make 1.5 to 2 crowns a day.
Weavers run mostly on Cabots; they are paid 2 crowns for 100 meters (meter=39.37 inches) of 15 pick (per quarter inch) goods, and other cloth in proportion.

Coal costs this mill 96 heller per 100 kilos, which is only $1.95 a ton, but is Hungarian coal of only some 4,500 calories. The mill is now erecting a large brick tenement house within the mill grounds for the operatives. Each family will have a large room, a kitchen, and a small room, at a cost of 2 crowns per week, and the mill intends also to furnish them with provisions and with coal at cost. The mill is building this at considerable cost so as to secure a class of steady help. The object in view is that the operative shall give his entire thought to his work and that the mill will furnish him with everything needed and look after his wants completely.

THE HAND LOOM STILL FLOURISHES—HOUSING WORKMEN.

This mill besides its cloth sales has a yarn production that it sells to hand workers. Robert Weiss, the treasurer, stated that there are required for the hand-loom weavers 15,000,000 pounds of bundle yarn yearly, part of which was supplied by Hungarian mills and part imported. Hungary is one of the countries where the hand loom still flourishes and there are quite a large number, especially in the sections farthest removed from the large towns.

Some of the mills furnish houses for their operatives and some do not. One manager with whom I talked thought that it was best for the hands to find their own lodging places, for when mills furnished houses it tended to concentrate the help in one place and so accentuate class interests. At Budapest there is a company organized especially for building homes for workingmen, and they have recently built 100 in the neighborhood of two textile plants. Each single house contains one large room, kitchen, pantry, and attic, and there are 120 square meters of land rented with the house. The rent of each house is from 265 to 285 crowns ($54 to $58) a year.

The Hungarian mill families as a rule live in very crowded quarters and their fare is exceedingly simple, meat or eggs being very rarely indulged in, but the conditions of life are better than those that obtain on the farm in most parts of the country, and the operatives are fairly well satisfied. Though taken all in all the cotton-mill hand with his steady work has a better existence than the farmer, there seems to be a tendency among the people to class factory work as lower than farm work, and this operates in many cases against the mills obtaining a full supply of local help.

CARING FOR OPERATIVES—IMPORTING HELP.

The operatives have their own sick-benefit societies. One textile manufacturer has also instituted a pension system for his employees. The company sets aside every week a sum equivalent to 8 per cent of its pay roll for this fund. Any employee found medically unfit after ten years' work will be paid a pension of 30 per cent of his regular wages, and his pension will be increased 2 per cent for every year worked over ten, so that for twenty years' work the pension will amount to half pay and for forty-five years' work will be full pay for the remainder of his days. This mill also has a special pension fund for its officials, but with the exception that they are required to

furnish half and the mill half of the amounts set aside every month for this purpose.

Mill men complain of a lack of labor everywhere. In Transylvania there is the peculiar situation of laborers going elsewhere for work, when their own industries are crying out for labor. There are Szecklers (Magyars), Saxons, and Roumanians in this district, but the Szecklers are of a migratory disposition and had rather go to Roumania and work part of the year there than work steadily in one place, so for regular work the mills have to import help from as far as Italy and Macedonia.

STRIKES ATTRIBUTED TO AMERICAN INFLUENCE.

Though the cotton mills are small, the labor question with them is already a vital one. Labor throughout Hungary is beginning to organize, and there are an increasing number of strikes. The strikes have ceased to be simply for shorter hours and higher pay, but have become an instrument in the fight for political power by the labor unions. The walking delegate is in course of development, and in nearly all cases one of the main demands of the strikers is the recognition of the union. They also demand that any foreman obnoxious to a majority of the workers be discharged, that the plant be shut down on May 1, "Labor Day," and also on special occasions when the unions desire to make political demonstrations. The employers call the spread of the union system the "American influence," and are very much opposed to it. The department of commerce, in its inspectors' reports, advised the manufacturers to organize to meet the workmen's organizations, and this is now being done in all branches. Some of these organizations extend throughout the country, so that in case of lockouts the laborers can not obtain work at any mill in Hungary.

THE DUAL MONARCHY.

Hungary and Austria, while nominally united in a dual monarchy, are really on a treaty basis. According to the new law which came into effect in January, 1907, "all of the industrial requirements of the State, and of municipal authorities, parish councils, or of any institute or institutions maintained or subsidized by the same, and of all home enterprises engaged in the service of public traffic, must be supplied by the industry of the countries of the Holy Hungarian Crown." Exemption may be granted only in individual cases where there is some special reason.

To insure industrial development of the country, the Government offers to remit taxes and duties, haul at cost on state railways, and in some cases to grant subsidies to new enterprises locating in Hungary. The concessions granted are very similar to those being granted by the Italian Government to new mills in southern Italy, but are even more favorable in their scope.

According to the law above quoted favors are to be granted to "manufacturing enterprises (factories) recently established in the lands of the Holy Hungarian Crown and equipped with the latest appliances of technical art, which produce articles not hitherto produced at all by manufacture in the said lands of the Holy Hungarian Crown, or at any rate not in sufficient quantities practically to satisfy

the demand, or which produce articles the increased production of which is desirable from an economic point of view." This law is applicable to all new factories, but under its application cotton manufacturing is especially favored.

CONCESSIONS TO COTTON MILLS.

Among the concessions granted to new cotton factories are the following:

1. Exemption from the payment of direct state taxes due on the output of the factory, and exemption from all municipal and parish dues imposed on those paying the said direct taxes. This also includes exemption from the payment of tolls levied by the Royal Hungarian minister of agriculture, either directly or indirectly, on state highroads and bridges, and in state roadsteads or harbors.

2. Exemption from the payment of Crown (treasury) and parish dues and charges exacted for the acquisition, lease, and transfer of factory sites and buildings, and of all machinery constituting an appendage thereof, as well as for the registration of the lease, and of all equivalents of the same; further, if the said enterprises take the form of limited liability companies or cooperations, or if, during the period for which the favors granted are in force, they be transformed into limited liability companies or cooperations, or be reorganized or become associated with other companies, they may, in addition, be exempted from the payment of stamps and dues, parish dues, and charges on contracts executed on the occasion of the formation of the company, the increase of the capital of the company, and the issue of shares or preference shares, whether such be issued on the formation of the company or later on with a view to increasing the capital of the company, and on all other deeds executed in connection with the said contracts, on all legal transactions referring to the paying in of shares or preference shares as well as of cooperation debentures and on all documents relating to the same as well as on the transfer of any property executed for that purpose.

3. All building materials required for the construction or expansion of factories and industrial establishments, as previously mentioned, shall be conveyed by the state railways or railways subsidized by the state at a rate covering only the working expenses, as well as all machinery and parts of machinery required for the equipment of the same, and in general all articles of equipment. Side tracks and short industrial lines required by said enterprises shall be built by the state at cost. Any shunting executed for said enterprises shall be at cost of merely the working expenses, or they may be specially exempted from all shunting charges for a certain period.

LIBERAL INTERPRETATION OF THE LAW TO BENEFIT MILLS.

In interpreting the above the Minister of Commerce ordered:

The freight charged for the articles above enumerated, which shall be carried by slow freight trains, shall be, if they belong to Class A, i. e., "sundries," in cases where charges are paid for at least 5,000 kilograms (5 tons) per car and letter of conveyance, a unit of 32 fillers (6.4 cents) per 100 kilograms (220.4 pounds) per kilometer, a charge of 8 fillers (1.6 cents) per 100 kilograms for "terminals," and

other charges payable on the basis of the legal freight dues; if, however, the articles in question belong to any other freight class, in cases where charges are paid per gross weight for at least 10,000 kilograms per car and letter of conveyance, a unit of 20 fillers (4 cents) per 100 kilograms per kilometer, a charge of 4 fillers (0.8 cent) per 100 kilograms for "terminals," and the other charges payable on the basis of the legal freight dues. The smallest charge per 100 kilograms shall be 8 fillers (1.6 cents). For the conveyance of goods on industrial lines connecting factories with the nearest railway station the "working expenses" to be charged shall correspond to 50 per cent of the regulation charges in force on the state railways and railways enjoying a guaranty of interest on the part of the state. In cases where only working expenses are charged, the loading and unloading of the goods shall be carried out at the cost of the party enjoying the concession.

The reduction in freight stipulated above generally takes the form of a refunding of the surplus over working expenses.

4. Permanent exemption from house rates is given to all dwellings of workmen built by the factory in conformity to the requirements of hygiene, which are offered to laborers as part payment of wages, or on condition that a certain part of their wages shall be devoted to the payment of rent or the acquiring of said dwellings on the hire-purchase system. Also all dwellings built by outsiders for the use of workmen as above may be exempted from all house rates for a period of twenty years.

This exemption from house rates includes not only house rates, but also the general income tax levied in proportion to the same, the national additional tax for the relief of the sick (sick relief fund), and all other public and parish dues contingent on the said house rates.

STATE SUBSIDIES IN ADDITION TO CONCESSIONS.

Besides the concessions granted above, the Minister of Commerce is authorized, where cases of general interest render the creation, expansion, or maintenance of a certain industry desirable, to concede a State subsidy to certain enterprises in the form either of a lump sum or an annual subvention, payable for a certain number of years, or to promote the creation of such enterprises by the offer of state support by participation. Under this law the new cotton mills are being granted a subsidy equal to one-fourth of their capital stock, and this is paid to the company in ten yearly installments.

The granting of any or all of the concessions described may be petitioned for within one year of the day on which the factory started work, and the minister may also guarantee the granting of concessions even before the factory is established. Favors granted are for a period of fifteen years, except where otherwise stated. A petition may be presented for the prolongation of favors enjoyed after the latter have become invalid, but any such petition must be presented within one year after the concession previously granted expires.

An essential condition of any concession is that three-fourths of the workmen and officials shall be Hungarian citizens. Furthermore, factories or industrial establishments enjoying such favors are bound

to procure all the articles for building and equipment, as well as the materials and half-finished products required in working, from home factories and producers, provided such are made or produced in the required form in the lands of the Holy Hungarian Crown. In cases where exemption is justified the minister of commerce may grant exemption.

In 1900 there were 80,000 spindles in the cotton mills of Hungary; at the present time there are in operation and in course of erection 200,000. It is expected that the government aid now being extended to the mills will result in the industry being largely increased in the next few years.

SWITZERLAND

COTTON GOODS PRODUCTION.

SLOW PROGRESS IN MANUFACTURING—CONDITIONS AMONG THE MILL OPERATIVES—A TARIFF FOR PROTECTION.

The cotton mills of Switzerland have remained almost stationary for the last ten years. Only in special lines of cotton manufacturing, such as the embroidery business, has there been any progress, and the advance in this direction has been of great help in enabling the mills to survive by furnishing an outlet for Swiss cloth and yarn.

The Swiss cotton mill men have had to face higher and higher tariff walls in neighboring countries and also a much keener competition due to these countries rapidly enlarging their factories. The Swiss markets for yarn and cloth lie mainly among their neighbors in Europe, so the result of the advancing industrialism of their former customers has been to cut off their orders on all coarser grades and drive the Swiss mills to finer and finer goods. In their home market they have to compete with the inroads of the Italian coarse counts and the English fine counts, to which is added, in times of depression, sporadic imports of German, Belgian, and French goods, which are dumped into Switzerland as the nearest market at what the Swiss refer to as "bankrupt prices." The Swiss tariff was raised in 1905 especially to enable them to control their home market against being used as a dumping ground.

DISADVANTAGES UNDER WHICH SWISS MILLS ARE OPERATED.

The Swiss mills have to import all their coal and cotton and most of their machinery, and a great number of the mills are located in isolated places where water power was available and where country help could be obtained cheaply. This has proved quite a drawback, for the unfavorable location has made it hard to keep help, and some mills are put to a good deal of extra expense for hauling. There is a dearth of local help, and the mills are driven more and more to the employment of Italians and Germans. The increase of the embroidery business, while of advantage, in affording an increased home outlet, has accentuated the labor difficulty of the mills by enticing away their best workmen. Many also go into the silk business. When the silk and embroidery lines are slack the cotton mills have an abundance of help, but at other times they have to stand a constant drain which they only make good by the employment of Italians. The Swiss still have very cheap labor, but on coarse goods the Italians have the advantage, because their labor is 10 per cent cheaper, and their mills can run at night, while on fine goods the English have the advantage because of the greater efficiency of their operatives, which more than compensates for the higher wages paid.

There are no Government statistics as to cotton manufacturing in Switzerland, for the reason that the control of the country is so decentralized there is no power delegated by the people for such a purpose. The Government is authorized to employ factory inspectors to see that the Confederacy laws in regard to factory operation are carried out, and these, in their occasional reports, give the number of male and female operatives, the number of accidents, etc., but any statistics in regard to the extent of the industry can only be obtained from outside sources.

SPINDLES, LOOMS, AND MILLS.

The president of the Swiss cotton manufacturers association (the Schweizerischer Spinner-, Zwirmer-, und Weber-Verein) gives the following as the number of spinning and twister spindles in Switzerland on January 1, 1907, with a partial list of the number of looms.

Canton.	Spindles.	Twister spindles.	Looms.	Canton.	Spindles.	Twister spindles.	Looms.
Zurich	631,818	30,382	8,197	Solothurn	30,244		102
St. Gall	275,228	15,492	3,057	Thurgau	13,492		1,474
Glarus	200,642		3,909	Luzern	12,000		
Aargau	92,470	8,022	706	Schaffhausen		3,400	
Zug	87,992			Appenzell			166
Schwys	50,140		831				
Bern	50,000		400	Total	1,474,026	57,296	18,842

Of the looms 2,096 were given as being on colored goods, and 602 were Jacquard looms. The great bulk of the spindles are mule spindles. The number of looms stated is only partial, due to the fact that some weave mills are independent of the association.

The figures for January 1, 1908, from the same authority, show 1,499,170 spinning spindles, with 9,900 operatives; 117,782 doubling spindles, with 2,342 operatives, and 22,709 looms, with 13,854 operatives.

The cotton mills are entirely in the northeastern section of Switzerland, mainly in the cantons of Zurich, St. Gall and Glarus. The city of Zurich is the largest and most important commercial center of Switzerland, and the cotton manufacturing industry (outside of the special line of embroidery which centers at St. Gall) has its headquarters at that point. There are few mills at Zurich, but the larger mills have their offices there, most of the banking and export business is carried on at that city, and the manufacturers association has its office there.

SIZE OF FACTORIES AND COST OF OPERATING.

There are cotton mills at Winterthur, Wald, Flums, Baar, Wetziken, Mels, etc., but the mills are so scattered that none of these places can be claimed as big cotton mill centers and, in fact, Switzerland has no great mill center, as each owner has tried, it would seem, to locate his mill as far away from any other mill as the small limits of the district would permit. Most of the mills are small, the average being 22,000 spindles or 300 looms. There are four yarn mills containing over 50,000 spindles, the largest one being at Zurich, and containing 179,520 spindles, one at Flums with 100,000 spindles, one

at Baar with 58,068 spindles, and one at Langenthal with 50,000 spindles. The weave mills with over 300 looms are nine in number, which contain from 500 to 840 looms.

About 50 per cent of the cotton mills are operated by water power, 40 per cent by steam, and 10 per cent by electric or other motive power. The new mills are mostly steam or electric, and those that utilize water power have it electrically transmitted, and no longer locate at the fall, as was necessary with the old mills. A manager of one of the water-driven mills told me that while his motive power was cheaper than that of the steam-driven mills, in regard to direct operation, the difference was small, and that if the interest be figured on what they had had to pay for buying up water rights, to prevent the stream being diverted for other purposes, as well as the costs of canal and flume and upkeep, his power was actually costing him more than that paid by the steam-power mills. The majority of the Swiss mills are one or two story buildings, of brick or stone, with sawtooth roofs. The steam-heating pipes are usually fastened to the wall about a foot above the floor, and are made with projecting flanges every couple of inches, so as to give the greatest amount of radiating surface.

The complete cost of a spinning mill is given by the president of the spinners' association at about 80 francs ($15.44) a spindle. Most of the textile machinery is imported from England, especially the spinning machinery, though a good deal of weaving machinery is made in Switzerland, and some machinery, mainly dyeing and finishing, comes from Germany. There is an import duty of 77.2 cents per 220 pounds on textile machinery. All of the embroidery machinery is made in Switzerland. Looms made in Zurich are not only operated in Switzerland, but are largely used in Italy, and some exported to other countries. All coal used in Switzerland has to be imported and the present (January 1, 1908) price of German coal landed at Zurich is 34.3 francs ($6.62) a ton.

FACTORY LAWS AND MILL EMPLOYEES.

In regard to legal restrictions, children under 14 years of age can not work in the mills. The weekly hours of labor in the mills are 64, 11 hours for five days and 9 hours Saturday. The usual hours for mills working this time are from 6 to 11.30, and from 1 to 6.30. There is a continuous campaign waged by the workers for shorter hours, however, and most of the mills do not now run over 10 hours, some only 9, and the prospect is for still shorter hours.

One interesting feature of the Swiss laws is that no factory is allowed to work at night, and by night is meant from 8 p. m. to 6 a. m. For any overtime a permit has to be obtained from the local authorities, and only in very rare cases, such as the partial loss of the factory by fire, is a mill allowed to run up to 12 o'clock at night, and then only with extra help; in no case is all-night work allowed. Italy, for this reason, has heretofore been able to displace Switzerland in certain lines, because of the cheapened cost due to night and day work, but under the new Italian law women and children can not work at night, and as the Italian mills are operated mainly by women and children this practically has the same effect as the Swiss prohibition.

The Swiss laws are very particular in regard to precautions against accidents, and it is interesting to note that a report made by the government inspectors in 1906 shows that cotton manufacturing is the safest industry in Switzerland, for, with the largest number of establishments and much the largest number of operatives, it yet furnished less than 1 per cent of the accidents. The percentage of accidents in the various industries according to the report was as follows:

Industries.	Per cent.	Industries.	Per cent.
Metals and machines	29.20	Paper making	3.44
Woodworking	15.77	Work in brass, etc	1.54
Cement, bricks	14.98	Textile industry	.97
Food, stimulants	14.93		
Clocks, jewelry	10.45	Total	100.00
Chemical industry	8.69		

IMPORTING FOREIGN WORKERS.

A government report in 1902 (the latest) gave the number of workers in the cotton manufacturing industry in Switzerland as 49,023, of which 8,392, or 17.1 per cent, were children from 14 to 18 years of age; 22,880, or 46.7 per cent, women, and 17,751, or 36.2 per cent, men. The proportion of women and children tends to increase, due to the sharp world competition making it imperative to keep down costs which are rising with higher price of materials and higher wage tariffs. Of the help brought in from Italy the majority are girls. The proportion of foreign help is becoming larger every year. Of the 49,023 workers in 1902, 44,886 were Swiss, 1,673 were Italians, 1,547 Germans, 874 Austrians, and 43 other nationalities. This 8.85 per cent of foreign operatives has since largely increased, and about an eighth of the hands are now from other countries. Italians are used throughout Switzerland for the cheaper jobs, such as road making, etc., and since, as a rule, the wages are lower in Italy than in the other surrounding countries, most of the foreign operatives are Italians; but the increasing demand for operatives in Italy itself will in time cut off this source of cheap labor. The Swiss are patient, industrious workers, and however small their wages they always contrive to have an account at the savings bank. In the country their diet seems to be coffee, bread, and potatoes three times a day, with meat and wine on Sundays.

Formerly there was a great deal of hand-loom weaving in Switzerland, but this is now a thing of the past. In the embroidery business around St. Gall there is quite a large house industry, but even there the hand embroidery machines are being displaced by machines operated by electricity furnished by lines from the power companies. Hand looms are now to be met with only in isolated homes.

The largest cotton manufacturing company in Switzerland has its office in Zurich, but the mill is located at the small village of Windisch, some 20 miles north of Zurich. This mill has 179,520 spindles, and just at present is doing a good business, but it is significant of the fight of Swiss manufacturers against adverse conditions that in 1900 this mill had 246,692 spindles, and that as spinning frames have worn out they have not been replaced.

WAGES AND HOUSING OPERATIVES.

The hours of labor in this mill are eleven per day (with nine on Saturday), viz, from 6 to 12, and 1.30 to 6.30. When overtime is imperative a permit of the local authorities has to be obtained, and the operatives are paid one-third extra. There is never any night work, as that is forbidden by law. The average daily wages paid by this mill, as furnished me from the books, are as follows:

Operatives.	Wages.	Operatives.	Wages.	Operatives.	Wages.
Weavers	$1.03	On fly frames	$0.62	On reels	$0.55
Picker hands	.74	Mule spinners	.85	Outside laborers	.77
On cards	.58	Ring spinners	.55	Wood workers	.97
On draw frames	.62	Twisters	.51	Iron workers	1.06
On combers	.62	On gassing frames	.64		

On account of the scarcity of Swiss workers, this mill, in common with most others, has had to employ Italian help. They now have 125 Italian girls, and for lodging them the mill has built a special home, which cost $24,125. The girls are lodged in large rooms, each accommodating a dozen or more, and there are bathrooms, a sick room, and a large garden attached. The home is looked after by six Catholic nuns, who are paid by the firm. Each girl pays 90 centimes (17.4 cents) a day for food, lodging, light, etc. The mills as a rule have little trouble in getting help from Italy, and very often a mill simply notifies the local priest of the number of new hands needed, and he notifies his fellow-clergyman in Italy, who informs his flock, and the required number are shortly on hand.

Besides the special large tenement house for Italian girls, this firm has about 100 dwelling houses, each composed of one living room, two or three small rooms, kitchen, and cellar, with 3,240 square feet of land for gardening. The rent varies according to location, size of rooms, etc., from $15 to $35 a year. The manager stated that in the neighboring villages the usual rents for similar dwellings are $48 to $58. The mill furnishes operatives with pure milk at 3⅔ cents a quart, the outside price being 4.3 cents. The firm is now building a house where bathrooms, kitchen for cooking and warming up, reading room, and dining room will be provided for the use of the operatives. There are now two kindergartens managed by the firm, for which the workpeople pay 4 cents per baby per month. The operatives have their own society for cases of sickness, and they also have a cooperative store where they buy provisions, and from which they receive at the end of the year a dividend of all profits made above cost and expenses, which usually runs about 15 per cent a year.

WAGES AND PRICES OF THE NECESSARIES OF LIFE.

An Austrian manufacturer who has made an investigation of Swiss cotton manufacturing gives me the following tables as the actual average daily wages and cost of food at four mills in different parts of Switzerland in the first part of 1907, reduced to American currency. The first table covers the wages:

Operatives.	Mills.			
	No. 1.	No. 2.	No. 3.	No. 4.
Blow room:				
Head man	-------	-------	$1.06	$0.74
Workman	$0.65	$0.59	.60	.53
Waste man	.61	.55	.56	.56
Cards:				
Head man	1.42	.85	1.16	1.12
Card grinder	.77	.67	.62	.66
Can boys	.61	.51	.59	.51
Lap carrier	.60	.51	.54	.53
Oiler	-------	-------	-------	.42
Draw-frame girls	.48	.43	.41	.40
Speeders:				
Head man	1.22	.85	1.06	1.10
Oiler	.61	-------	.64	.49
Speeder hands	.65	.50	.45	.55
Creelers	-------	-------	.35	.39
Ring spinning:				
Head man	1.14	1.07	.87	1.16
Oiler	.61	.61	.67	.44
Spinner	.56	.31	.43	.43
Doffer	-------	-------	.31	.33
Mules:				
Head man	1.27	1.15	.91	1.14
Oiler	.61	.61	.68	.47
Spinner	.91	.78	.65	.79
Piecer	.66	.51	.44	.53
Roving carriers	.53	.32	.37	.38
Reeling:				
Head man	.71	-------	1.06	-------
Reelers	.56	.41	.43	.45
Packers	.77	.65	.63	.74
Women bundlers	.47	.42	.48	.44
Machine shop:				
Head man	1.62	1.22	1.72	-------
Machinist	1.12	.73	.91	.99
Wood worker	1.12	-------	1.09	.74
Smith	1.02	-------	1.16	-------
Carpenter shop:				
Cabinetmaker	1.02	.69	1.01	1.02
Carpenter	.97	-------	.87	.83
Turbine minder	.85	-------	-------	.74
Fireman	.85	.71	.85	.85
Transmission tender	.85	.63	.66	-------
Night watchman	.81	.71	.63	.63
Porter	-------	-------	.46	-------
Repair department:				
Head man	.91	.91	1.17	-------
Repairer	.73	.59	.65	.59
Mason	.97	.73	.70	.76
Average per day	.63	.50	.47	.51

It will be noticed that some of the mills show no doffers. In a good many cases none are employed, but each three spinners work together and doff their frames themselves.

The prices of the necessaries of life for the operatives in the four mills were as follows:

Article.	Mills.			
	No. 1.	No. 2.	No. 3.	No. 4.
	Cents.	*Cents.*	*Cents.*	*Cents.*
Bread, average quality, 2.2 pounds	6.9	6.5	5.8	6.5
Meat, do	34.5	32.5	28.8	36.5
Flour, do	9.7	7.7	9.5	9.5
Potatoes, do	1.6	1.6	2.0	2.0
Sugar, do	10.6	17.8	10.6	13.4
Coffee, do	44.4	62.9	42.6	34.7
Salt, do	2.8	4.1	2.0	2.2
Milk, quart	3.9	4.1	3.7	3.9
Kerosene, do	3.5	8.5	4.1	4.2
Beer, do	7.7	6.3	5.7	6.7
Cheese, 1 portion	-------	4.1	-------	-------

SWISS CONTROL THEIR HOME MARKET BY A TARIFF.

The Swiss cotton industry is an old one and Switzerland was one of the first countries to take advantage of the English inventions in the early development of cotton manufacturing. The number of spindles steadily increased until 1875, when the mills began to feel the restrictions placed upon their export business by the tariffs of other countries. This was the high-water mark, and the industry began to decline and the spindles to dwindle until, in 1905, the spinners succeeded in getting a "fighting tariff" applied to this industry to check the inroads of foreign cotton manufactures. This has given the mills more control over their home market, and with the demand that has sprung up for cloth and yarn for the embroidery business, they have once more begun to slowly increase their capacity. The Swiss spindles now number about 1,500,000.

Swiss cotton mills now stand in the front rank in the production of fine yarns and cloth and in some lines their only competitor is Great Britain. There is a good business in medium numbers, but, since the Italian and other markets have been lost to them, there is very little manufacture of coarse counts. In spite of the fact that the fine counts of the Swiss make the cost of the raw material a smaller factor in the total cost of the finished article, the price of raw cotton determines, in great measure, the profit or loss in the business. The great fluctuations in the price of the raw material, and the changeability of the market for finished goods, as regards price and quality, was such from 1900 to 1905 that the mills were, on the whole, not very successful. Since 1905 the business has been better.

THE FEELING AGAINST COMBINATION.

In 1905 the Swiss spinners were pleased because the English yarn producers were so taken up with the Chinese and Indian markets as to leave the Continent free. In the last days of 1904 the majority of the spinners united to form a syndicate to fix minimum prices for yarn, and so stop the ruinous losses they were suffering. This was beneficial and resulted in some prosperity to the trade, but only lasted as long as the stress continued. This tended to do away with the spirit of individual liberty that is usually so strongly manifest. The "Canton" spirit, that is so strong in Switzerland, does not tend to unity among the mills, even where their interests are identical, and where modern economical development makes it necessary for interests to work together for the common good. The industry has approached a condition where it is not possible to increase the output to compensate for the increased cost, due to rising wages and the lowering of the number of hours, and the only solution is to limit the managing costs by combinations, but the mills are too independent for any general agreement.

The yarn exports continued to drop back during 1905, and Austrian demand for fine yarns began to decline under the new tariff, which levies 38 kronen ($7.71) instead of 33.3 kronen ($6.76) and 28.5 kronen ($5.78) (on Nos. 50 to 60 and above No. 60, respectively), on Nos. 50 to 70, and for Nos. 70 to 80 as much as 43 kronen ($8.73) against the former 28.5 kronen ($5.78). This caused an increase of

fine spinning in Austria. Germany reduced the tariff on coarse yarns, but not on fine yarns, as they were afraid of Swiss competition in the latter. The French tariff practically shuts out Swiss yarns. Owing to the representations of the spinners, the Swiss Government in 1906 raised the tariff on yarns, which was an aid to the home mills, but owing to the embroidery demands for cloth and yarn, it did not stop the import.

There was a strong demand for broad muslins 120 to 140 centimeters (47.2 to 55 inches wide), and contracts were made up into 1907. This demand resulted in the establishment of several new weaving establishments and in old mills being changed from narrow to broad goods. In the regular muslin weaves of 70 to 80 yarns, in widths under 100 centimeters (39.37 inches) there was also a good profit and, consequently, looms on medium calicoes were changed to these articles.

PROSPERITY DURING PAST TWO YEARS.

In 1906 the business was unexpectedly prosperous, and as the whole world seemed to need goods the export business revived. Owing to the fact that so many looms had been changed from calicoes to muslins, the calico yarns were slack the first part of the year, but a demand for calico springing up, prices rose rapidly. In No. 38s, for instance, the price in January was 2.35 francs a kilo (45.3 cents per 2.2 pounds), but in December it was 3 francs a kilo (57.9 cents). The strike that broke out in some spinning establishments at Mulhausen aided in increasing the price of yarn, but the strike did not last long. There were continued labor difficulties, and costs of operation increased. Production, which had increased through the addition of new machines, was brought back to the old point by the successful agitation for shorter hours. The great increase in the embroidery business helped the mills on fine spinning and weaving, and there was a great demand for Nos. 60 to 80, and for No. 120s throughout the year. A brisk demand for ply yarns resulted, which the twisters could not satisfy, resulting in large purchases of yarn, extending up into 1908. The embroidery mills are more and more using 40s, 3 ply, instead of 60s, 2 ply, so that there was also a good business done by the medium count mills. This change has resulted in many spinning mills having to change very considerably the counts they spin, which involves some outlay.

During 1907 the industry as a whole, following the lead of embroidery, was very prosperous, but the money crisis in the United States affected all branches of the industry adversely. For the year, as a whole, the mills made goods profits, and not only the fine weaving but flannels, drills, blouses, betilles, and other lines paid well.

The Swiss spinners do not have any uniform selling agreement, such as is the case in Italy and other countries, for the reason that the mills are hard to get into line on any question. The Spinners and Weavers' Association, almost since its inception in 1878, has tried to obtain some uniform agreement on this subject, but could never get a majority of the mills to sign. The conditions they have sought to obtain are: (1) Conditions of payment to be 4 per cent discount and one month bank remittance, or 3 per cent discount and 3 months bank remittance; interest on current accounts of 5 per cent; (2)

shipment of yarn free to the nearest railway station to the receiver; (3) return of empty cases; (4) rate of exchange to be mean between letter and money on the day of arrival of the remittance.

IMPORTS OF RAW COTTON—EXPORTS OF COTTON GOODS.

About 40 per cent of the cotton used in Switzerland is Egyptian, the remainder being American, with a small quantity of Indian. In proportion to its number of spindles no other country uses anything like as much Egyptian cotton as Switzerland. The following table shows the import of cottons for the years given:

Kind.	1896.	1900.	1906.
	Pounds.	*Pounds.*	*Pounds.*
American	28,761,318	28,299,138	30,111,268
Egyptian	21,880,871	22,279,354	19,766,133
Indian	2,011,370	372,476	2,271,222
Other	505,598	154,500	221,502
Total	53,159,157	51,105,468	52,370,125
Reexports	1,658,130	2,624,080	1,128,007
Net imports	51,501,027	48,481,388	51,242,118

The Swiss exports of yarns and cloth have been declining, so that, in spite of the great increase in the export of embroideries, the total export of cotton manufactures was less in 1906 than in 1900, viz, 35,782,822 pounds and 36,681,833 pounds, respectively. The total exports of cotton manufactures from Switzerland to the several countries, in 1906, were as follows:

Description.	Exported to—					
	United States.	United Kingdom.	Germany.	Asia.	Mexico and Central and South America.	France.
Yarns, single, gray	$40,916	$1,351	$1,444,026	----------	$48,443	$74,305
Other yarns	21,403	17,949	92,640	$713,907	13,510	38,986
Total of yarns	62,319	19,300	1,536,666	713,907	61,953	113,291
Piece goods:						
Gray	54,812	16,984	712,363	4,439	7,141	60,988
Bleached	266,147	146,101	274,832	50,952	94,763	38,600
Dyed	35,126	106,729	145,715	252,251	226,196	113,291
Printed	----------	4,825	7,913	684,957	54,040	18,335
Of dyed yarn	2,702	2,702	20,265	335,820	129,117	19,493
Total of piece goods	358,787	277,341	1,161,088	1,328,419	511,257	250,707
Embroideries	13,475,646	5,474,059	1,872,486	318,836	1,650,343	1,516,594
Laces	965	1,737	10,036	386	772	1,737
Made-up goods	3,281	11,966	28,178	6,369	101,325	28,757
Other goods	791,967	545,032	298,378	335,048	167,331	44,776
Grand total	14,695,965	6,329,435	4,906,832	2,702,965	2,492,981	1,955,862

Description.	Exported to—Continued.				Grand total.
	Austria-Hungary.	Italy.	Balkan States.	All other countries.	
Yarns, single, gray	$227,354	$16,598	$386	$57,900	$1,911,279
Other yarns	208,247	94,184	43,425	127,786	1,372,037
Total of yarns	435,601	110,782	43,811	185,686	3,283,316
Piece goods:					
Gray	98,816	42,653	20,458	48,057	1,066,711
Bleached	98,430	83,955	86,271	188,368	1,328,419
Dyed	71,410	115,028	50,759	258,620	1,375,125
Printed	46,899	93,605	308,028	150,347	1,368,949
Of dyed yarn	3,088	4,053	210,370	203,808	931,418
Total of piece goods	318,643	339,294	675,886	849,200	6,070,622
Embroideries	506,625	603,125	210,177	3,138,373	28,766,264
Laces	11,966	38,600	2,702	5,983	74,884
Made-up goods	6,176	18,721	6,948	26,634	238,355
Other goods	54,619	46,899	32,617	250,707	2,570,374
Grand total	1,333,630	1,157,421	972,141	4,456,583	41,003,815

SWITZERLAND'S BEST CUSTOMERS—IMPORTS OF COTTON GOODS.

It is seen that the best customers for Swiss embroidery are the United States and the United Kingdom, while for cotton-mill products the best markets are those nearest to Switzerland. The best yarn market is Germany, while gray goods go to Germany, Austria, and France, and bleached goods to Germany, America, and England. Of the smaller amounts of other cloths the solid dyed goods go to Asia, South America, and Germany; colored goods to Asia, the Balkans, and South America, and printed goods to Asia and the Balkan States.

Swiss exports in embroideries are increasing rapidly, and the trade in embroidery cloths and fine bleached cloths is also increasing, but in most other lines the cotton exports have been declining, especially in yarns. On the other hand the imports of cotton goods into Switzerland have been on the increase, due mainly to the expansion of the embroidery business. This condition of affairs is clearly shown by the following table, contrasting the exports and imports of cotton manufactures in 1900 and 1906:

Description.	Imports.		Exports.	
	1900.	1906.	1900.	1906.
Single yarns, gray	$263,066	$1,138,932	$2,665,720	$1,911,279
Other yarns	1,514,403	1,154,807	1,199,440	1,372,037
Cloth:				
Gray	3,324,720	5,073,391	1,421,049	1,066,711
Bleached	134,663	222,915	352,151	1,328,419
Dyed	426,839	361,875	756,932	1,375,125
Printed	409,361	562,981	1,511,506	1,368,949
Of dyed yarn	90,467	394,492	1,276,354	931,418
Embroideries	115,149	253,332	21,339,385	28,766,264
Laces	154,235	271,312	62,771	74,884
Made-up goods	639,332	2,126,667	71,279	238,355
Others	2,965,960	3,693,879	1,871,294	2,570,374
Totals	10,038,195	15,254,583	32,527,881	41,003,815

EXPORTS TO THE PHILIPPINES.

The Swiss shipments of cotton manufactures to the Philippines in 1906 amounted to $334,866, and consisted of the following, according to the Swiss returns:

Description.	Pounds.	Value.	Description.	Pounds.	Value.
Yarn, bleached, glazed, or mercerized	23,142	$16,732	Piqués, damasks, brilliantines, etc	$2,645	$2,323
Yarn, dyed or printed	178,083	59,658	Brocades	3,816	7,178
Cloth:			Embroidery	1,763	2,685
Bleached or mercerized	66,120	39,779	Embroidered cloths	14,106	24,388
Colored	150,313	78,914	Other articles of cotton	4,849	3,944
Printed	7,714	4,987			
Of colored yarn	174,557	94,278	Total	632,108	334,866

The main article shipped by the Swiss is the cotton netting called "betilles," used by the Filipino women for shirt waists which are worn plain, embroidered, colored, dyed, etc.

O